ENVIRONMENTAL PRIORITIES INITIATIVE
PRELIMINARY ASSESSMENT

Purpose: RCRA Preliminary Assessment

Site: Lockheed Missiles and Space Company, Inc.
1111 Lockheed Way
Sunnyvale, California
Santa Clara County

Site EPA ID Number:	CAD009125535
TDD Number:	F9-9006-010
Program Account Number:	FCA1517RAA
FIT Investigators:	Kimberly Hall Howard Edwards Laura Kadlecik
Date of Inspection:	October 17, 1990
Report Prepared By:	Kimberly Hall
Through:	Howard Edwards
Report Date:	December 31, 1990
FIT Review/Concurrence:	
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1. INTRODUCTION

As part of its Environmental Priorities Initiative (EPI) program, the U.S. Environmental Protection Agency (EPA) has requested Ecology and Environment, Inc.'s Field Investigation Team (E & E FIT) to conduct a Preliminary Assessment (PA) of Lockheed Missiles and Space Company, located at 1111 Lockheed Way, Sunnyvale, California.

The EPI program integrates the Resource Conservation and Recovery Act of 1976 (RCRA), as amended by the 1984 Hazardous and Solid Waste Amendments (HSWA), with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), in order to set priorities for cleanup of the most environmentally significant sites first. The Preliminary Assessment is conducted using CERCLA proposed revised Hazard Ranking System (HRS) criteria to determine the site's eligibility for inclusion on the National Priorities List and, thus, assists in prioritizing facilities for the RCRA program.

2. SITE DESCRIPTION

2.1 SITE LOCATION AND OWNER/OPERATOR HISTORY

The Lockheed Missiles and Space Company, Inc. (Lockheed) site is located at 1111 Lockheed Way in Sunnyvale, California, at Township 6 South, Range 2 West, Sections 12 and 13, Mount Diablo Base Line and Meridian (Latitude: 37° 24′ 10", Longitude: 122° 02′ 10") (see Figure 1, Site Location Map) (1,2). The site is also known as the Lockheed Facility One site. The site occupies approximately 660 acres within the Santa Clara Valley at the southwest end of San Francisco Bay, north of the junction of U.S. Highway 101 and State Highway 237 (3).

Lockheed develops and manufactures satellite and missile components for the aerospace industry and the military at the site. Except for a 48-acre parcel located in the middle of the facility, the site is owned by the Lockheed Corporation of Burbank, California. Lockheed sold the 48-acre parcel, which includes Building 182, to the U.S. Navy in the late 1950s. Additionally, other portions of the site have been owned in the past by B-S-K Associates of Burlingame and The Prudential Insurance Company of America of San Francisco (see Figure 2, Facility Map) (4,5).

Prior to 1956 the Lockheed site was agricultural land. Lockheed began construction of the first buildings in 1956, and manufacturing operations began in 1958. By 1963, most of Lockheed's manufacturing and chemical process facilities were in place. However, construction of new buildings on the site has occurred intermittently from 1956 until the present (3).

The Lockheed facility presently consists of 35 large structures which are used for research, testing, manufacturing, laboratory, and management and clerical support activities. In addition, there are approximately 30 smaller structures, both fixed and mobile. Because much of the work conducted at the site is classified, access to many of the buildings is severely restricted by Lockheed's security department (3).

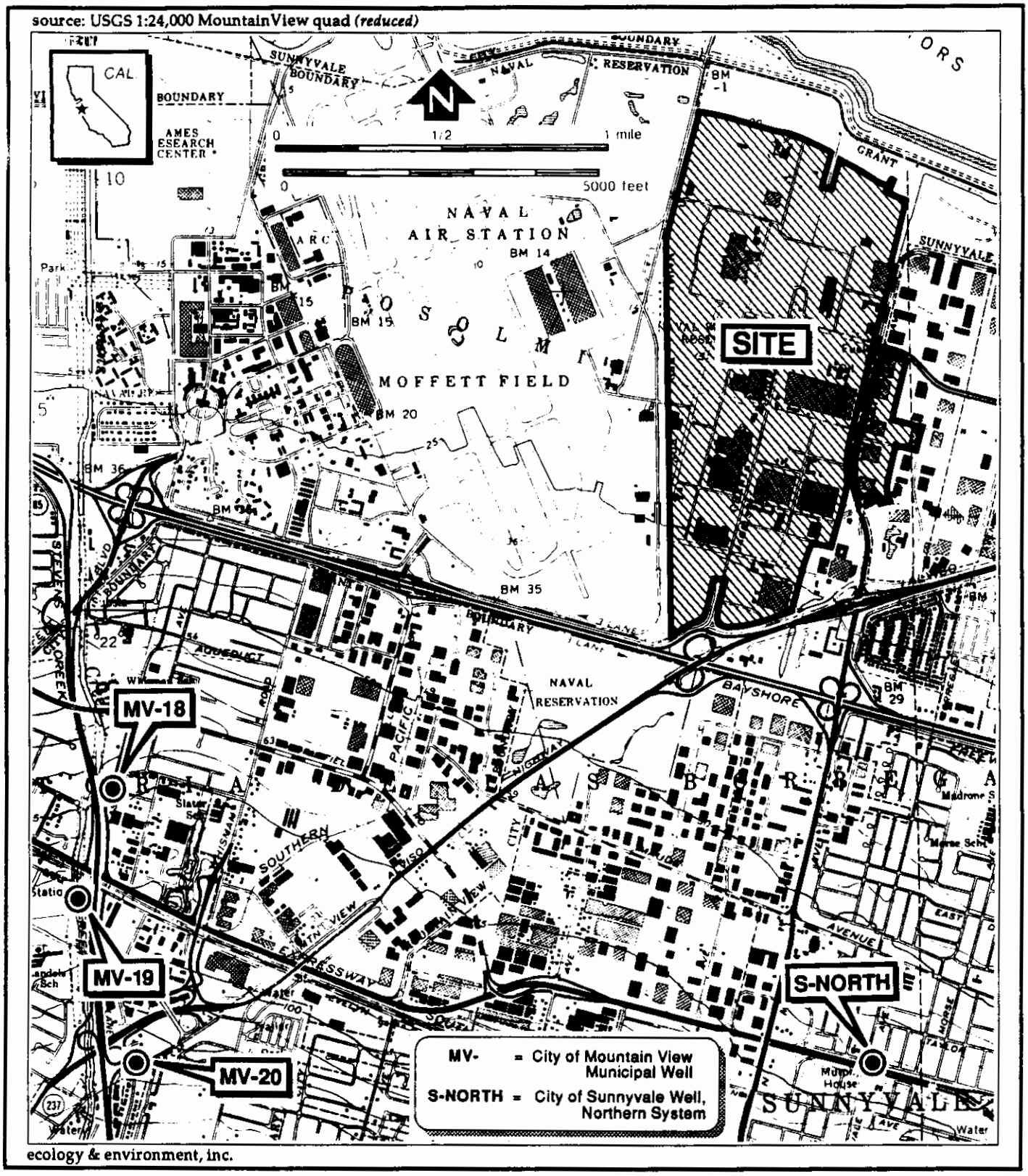

Figure 1

-- SITE LOCATION --

LOCKHEED MISSILES and SPACE COMPANY

1111 Lockheed Way

Sunnyvale, CA

source: McLaren

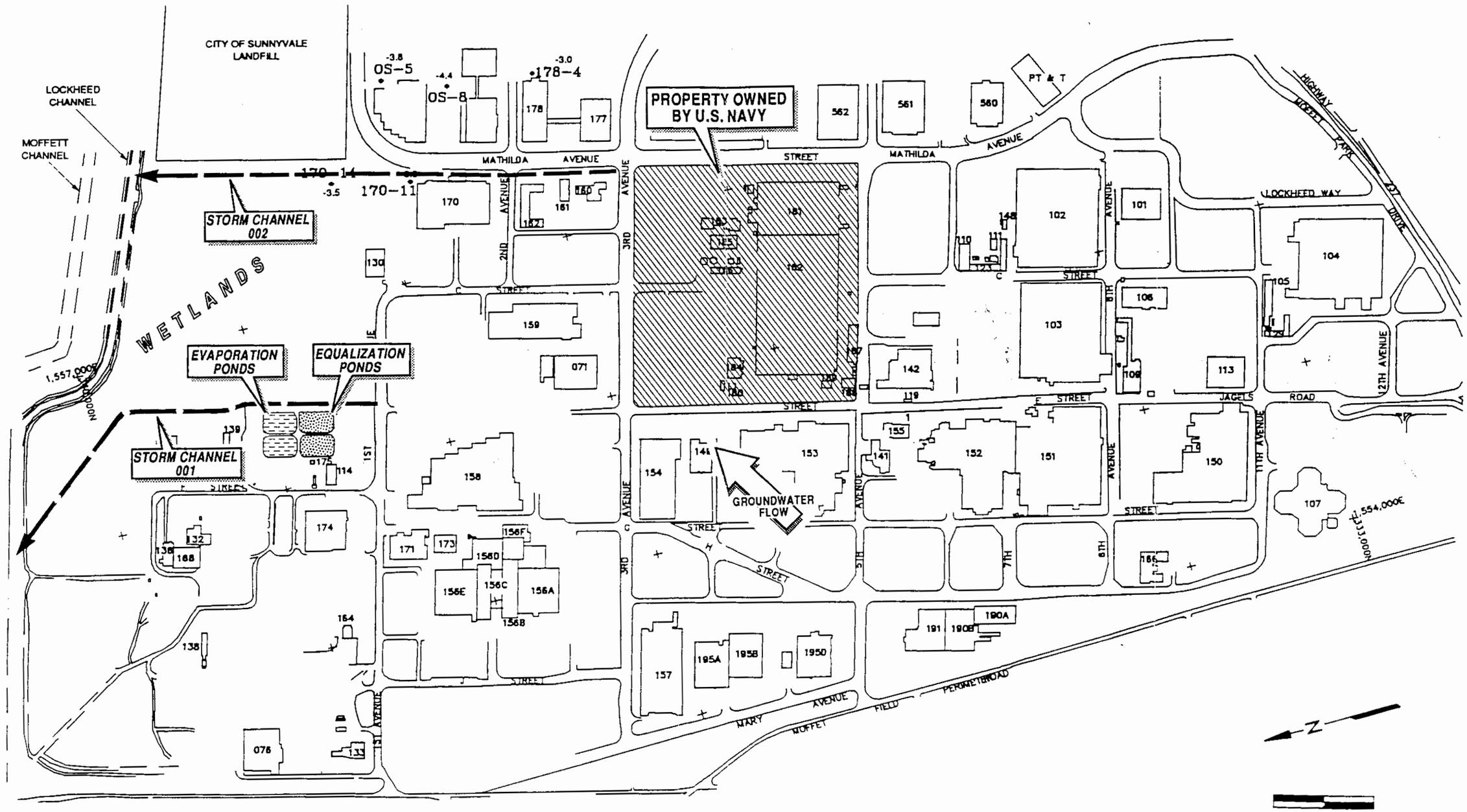

Figure 2

FACILITY MAP

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2.2 FACILITY PROCESSES/WASTE MANAGEMENT

Facility processes related to Lockheed's manufacturing, chemical processing, and research and development operations include metal finishing and electroplating, degreasing, and spray painting. Lockheed's operations require the storage and use of acids, bases, metal solutions, solvents, fuel hydrocarbons, and small amounts of radioactive material (6).

There are currently 10 buildings at the Lockheed site where metal finishing/electroplating and spray painting operations occur. These are buildings 041, 071, 103, 150, 151, 153, 155, 159, 170, and 182. Metal finishing operations are conducted at seven of these ten buildings (071, 103, 150, 151, 153, 170, and 182). With the exception of Building 151, wastewater from Lockheed's buildings is discharged to Lockheed's equalization ponds prior to discharge to the Sunnyvale Publically Owned Treatment Works (POTW). Building 151 discharges small quantities of metal finishing effluent directly to the POTW. Of the seven buildings where metal finishing operations occur, two buildings (071 and 182) also conduct wet paint booth operations. The other three buildings (041, 155, and 159) have no metal finishing operations but operate wet paint booths. Discharge from wet paint booth operations goes directly to the POTW (5,7). See Appendix C, Locations of Spray Paint Booths and Degreasing Units. Please refer to Sections 4.1 and 4.2 for more detailed descriptions of a metal plating area and a spray paint booth at the Lockheed site.

Lockheed currently conducts degreasing operations in twelve buildings at the site. These buildings are 076, 103, 113, 130, 150, 151, 153, 170, 182, 183, 195B, and 562. There are currently 39 degreasing units regulated by the Bay Area Air Quality Management District (BAAQMD) on site. These units range in size from small desk-top units to large 12,000-gallon capacity units used in Lockheed's manufacturing operations (Appendix C) (3,8). Please refer to Section 4.3 for a description of a degreasing unit at Lockheed.

Aqueous wastes that are generated from on-site processes are treated on site by specific treatment units primarily located in Building 114 area. Other waste materials are temporarily stored and hauled off site within 90 days of generation (6). The storage occurs either at the location of generation or in the Building 114 area. Refer to Section 4, Description of Individual Solid Waste Management Units, for descriptions of hazardous waste treatment and storage facilities at the Lockheed site.

3. REGULATORY INVOLVEMENT

3.1 U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

Lockheed filed a Notification of Hazardous Waste Activity for the Lockheed site on August 18, 1980 in compliance with Section 3010 of RCRA (9). The facility filed the Part A permit application for the site on November 19, 1980. The application apparently covered the wastewater

treatment units which included two surface impoundments and the hazardous waste storage areas (4,6).

After submitting the Part A application, Lockheed apparently reevaluated and modified its wastewater treatment units. Currently Lockheed considers it primary wastewater treatment unit refered to as the Central Wasterwater Treatment Plant (aka: Andco Treatment Unit) to be an "elementary neutralization unit" as defined in 40 CFR 260.10. Lockheed therefore contends that the treatment plant is therefore exempt from RCRA regulations per 40 CFR 264.1(g)(6). (2,11).

3.2 CALIFORNIA DEPARTMENT OF HEALTH SERVICES

An Interim Status Document (ISD) was issued by the California Department of Health Services (DHS) on March 6, 1981 for Lockheed's wastewater treatment and storage units, its hazardous waste container storage, and for its two surface impoundments (4,10).

On July 24, 1984 DHS, acting on Lockheed's request, rescinded those portions of the ISD that covered the wastewater storage and treatment units (6). Lockheed submitted a revised Part A permit application on March 10, 1986 reflecting changes in the treatment and storage of hazardous waste. The changes included the deletion of the waste water treatment units and the deletion of the two surface impoundments which had under went closure.

The Operation Plan for the Central Wastewater Treatment Plant was submitted to the DHS on July 18, 1986 (2,11). DHS issued Lockheed a Hazardous Waste Facility Permit for the treatment plant. The permit was issued pursuant to Section 25200 of the California Health and Safety Code and regulated under Title 22 of the California Administrative Code. The permit covered only the transfer pipeline from various buildings and the treatment plant. The permit does not cover other operations on contiguous Lockheed properties. The permit became effective March 10, 1987 and expires on March 10, 1992 (12).

DHS certified clean closure of the two surface impoundments on July 31, 1987 after reviewing the engineering certification (6,41).

DHS issued Lockheed a Consent Agreement and Order on September 25, 1987 for violations noted during a March 24, 1987 inspection of the facility in which Lockheed was required to pay penalties in addition to improving hazardous waste management activities (6). The violations from the 1987 inspection report appear to be all administrative (44).

DHS granted Lockheed a treatment variance for the neutralization unit in Building 113 on March 17, 1988 and a Research Development and Demonstration variance for the operation of a fluorescent light crusher which expired June 30, 1988 and was never renewed. On September 8, 1988, Lockheed applied for a modification to the variance allowing the operation of the neutralization unit to include the treatment of other acids, caustics, and oxidizers. This modification request was denied on November 3, 1988 (6).

On May 17, 1990, Lockheed applied to DHS for a variance from the Hazardous Waste Facility Requirements. A variance was issued for electrochemical and physical treatment in the existing wastewater treatment unit and upgrade of the Hazardous Materials Processing Facility at Building 114. However, a variance was denied for the storage of sludge generated by the waste treatment process at Building 114 in containers for greater than 90 days. A variance was also denied for the treatment of cyanide in a cyanide-destruction system (6,14). Lockheed recently submitted an Operations Plan for the sludge storage area and the cyanide-destruction system to DHS. To date, a permit has not been issued for either request (15). Lockheed applied for a variance for a silver recovery unit located at Building 102 on May 19, 1988, but no variance has yet been issued for this operation (6).

Lockheed is not listed on the January 1990 update of the California Expenditure Plan for the Hazardous Substance Cleanup Bond Act of 1984 (13).

3.3 REGIONAL WATER QUALITY CONTROL BOARD

On December 16, 1981, the Regional Water Quality Control Board (RWQCB) adopted Waste Discharge Requirements (WDR), Order No. 81-67, establishing standards for the construction, operation, and monitoring of what was at that time a proposed industrial on-site waste treatment facility consisting of two equalization pond and two evaporation ponds (8). In June 1984, Lockheed informed RWQCB of leachate contamination resulting from a leak out of the west evaporation pond. The leak was repaired and the pond was restored to operation (41). RWQCB certified the two evaporation ponds were clean-closed on June 29, 1987 (16). On January 20, 1988, RWQCB adopted Site Cleanup Requirements, Order No. 88-13. The Order required Lockheed to perform a site-wide comprehensive investigation to define the local hydrogeologic conditions and the lateral and vertical extent of soil and groundwater pollution at the facility. Contaminant plumes had been identified upgradient of wells monitoring the evaporation ponds and were, therefore, considered to not be related to pond operation (17). On June 21, 1989, RWQCB adopted updated WDR, Order No. 89-106, which rescinded Order No. 81-67 and required Lockheed to initiate a groundwater self-monitoring program (18)

In 1976, Lockheed was issued NPDES permit CA0005754, WDR Order No. 76-75. The permit was last updated in 1978. The NPDES permit currently covers site runoff which is channeled through four storm channels which run from the south end of the property north to the Lockheed Channel and the nearby wetlands. The permit previously regulated the discharge of cooling water blowdown to the wetlands but Lockheed has discontinued this practice. As part of the permit, Lockheed is required to conduct quarterly testing at three locations: Lockheed storms channels 001 and 002 and the pump station where site runoff in the Lockheed Channel is pumped to Guadalupe Slough. Quarterly testing includes monitoring for oil and grease, pH, suspended matter, and bioassay testing. RWQCB is considering transferring the responsibility for monitoring the surface water discharges from the site to the City of Sunnyvale (19).

3.4 OTHER AUTHORITIES

On December 13, 1985, Lockheed applied to the City of Sunnyvale for a wastewater discharge permit to allow discharge of facility wastewater to Sunnyvale's sanitary sewer system. Lockheed was issued a permit for this discharge which became effective January 30, 1986. Lockheed submits a "long form" permit application annually and addresses those buildings which discharge wastewater to the POTW from metal finishing and/or wet paint booth operations. Also included in the application are four non-manufacturing wastewater sources which are: contact cooling and washing, maintenance and construction, janitorial cleaning, and transportable treatment unit (TTU) operations (7).

4. DESCRIPTIONS OF INDIVIDUAL SOLID WASTE MANAGEMENT UNITS

Distinct Solid Waste Management Units (SWMUs) have been identified to evaluate potential on-site sources of releases to air, surface water, groundwater, soil, and subsurface gas. A SWMU is defined as any discernible waste management unit at a facility from which hazardous constituents might migrate, irrespective of whether the unit was intended for the management of solid and/or hazardous waste.

Due to the size and complexity of the site, as well as the limited scope of a PA, FIT focused on the description of RCRA regulated waste treatment units at the facility as well as examples of major waste generation points including a degreaser, a spray paint booth, and a metal plating area. In addition to descriptions of the inspected facilities, FIT has briefly documented all known areas of waste generation (degreasers, paint booths, and plating shops), as well as areas of concern where contamination has been identified during the course of previous investigations. Additional undocumented SWMUs may exist at the site and are potential contributors to soil and groundwater contamination in the area.

4.1 METAL PLATING SHOPS

Unit Description: There are seven plating area on site. The plating area in Building 182 was viewed during site reconnaissance.

The plating area in Building 182 consists of various plating stations. The operations include electroplating and electroless plating with common and precious metals. The entire plating area is raised with metal grating set off the floor for access (22). Refer to Appendix B for a photograph of the inspected plating area at Building 182.

Date of Start-up: Unknown.

Date of Closure: Plating area in Building 182 is currently in operation.

Waste Managed: The plating shops manage wastewater from rinse tanks, quench tank, and spills from plating tanks and processing tanks. The wastewater contains levels of heavy metals (i.e., nickel, chromium, copper, zinc, lead, and iron), as well as cleaning compounds and anions

of the acid utilized (i.e., nitrates, phosphates chlorides, and sulfates). Wastewater from spills may consist of concentrated acid, alkali, neutral salt baths, or other chemicals used for cleaning, pickling (descaling), plating, etching, and anodizing operations (8). Wastewater from metal plating shops are piped to the Central Wastewater Treatment Plant (5).

Release Controls: Primary containment consists of the plating unit. Secondary containment is a concrete floor (22).

History of Releases: There are no known instances of releases from the Building 182 plating area.

4.2 WET SPRAY PAINT BOOTHS

Unit Description: There are 50 spray paint booths at the Lockheed site located in 19 buildings (20). A spray paint booth in Building 182 was viewed during site reconnaissance.

The spray paint booth at Building 182 is enclosed on three sides. The unit floor is composed completely of metal grating which overlies a large tank. This tank is filled with water which serves to catch paint booth overspray. Wastewater from the unit, as with all spray paint units at the facility, is discharged directly to the POTW without undergoing treatment (22). Refer to Appendix B for a photograph of the spray paint booth unit at Building 182.

Date of Start-up: Unknown.

Date of Closure: The spray paint booths in Building 182 are currently in operation.

Waste Managed: The waste managed by this SWMU is comprised of excess coating materials which is generated by overspray during painting operations. This generated waste is collected and stored at a centralized accumulation area (5). See section 4.8.

Release Controls: The wet spray paint booth overlies a large water-filled tank which serves to catch overspray material. Additionally, the top of the unit has filters which help reduce gaseous emissions (22).

History of Releases: No known instances of releases have been documented.

4.3 DEGREASING UNITS

Unit Description: There are 39 degreasing units at the Lockheed facility ranging in size from small table-top units to large units used in Lockheed's manufacturing operations. These units use the solvents 1,1,1-trichloroethane (TCA), Freon TF, Freon TES, and Alpha 565. Refer to Appendix C for a list of all degreasing units at the Lockheed site and the corresponding solvents used (21,22). A vapor degreaser in Building 182 was viewed during site reconnaissance.

The large 12,000-gallon capacity vapor degreaser at Building 182, one of the largest at the facility, utilizes TCA to remove grease from the metal parts that are assembled at the facility. The contaminated solvent is pumped to a 55-gallon drum which is removed to the main storage area at Building 114 prior to shipment off site. Waste solvent is not stored at the Lockheed facility for longer than 90 days (3,22).

Date of Start-up: Unknown.

Date of Closure: The unit is still in operation.

Waste Managed: The product managed at the 12,000-gallon capacity degreasing unit in Building 182 consists of TCA (21,22). This generated waste is collected and stored at a centralized accumulation area (5). See section 4.8.

Release Controls: The primary containment for the waste material consists of the steel tank that comprises the TCA degreasing unit. The secondary containment consists of a sump area with a metal grate over it which surrounds the unit. The secondary containment for a smaller degreasing unit in Building 182 consists of the cement floor which the unit rests on (22). Refer to Appendix B for photographs of the two degreasing units which were inspected during the reconnaissance visit.

History of Releases: There are no known instances of releases.

Table 1 lists all areas at the Lockheed site where metal plating, spray painting, and degreasing occur, as well as how many units are in each building.

Table 1

LOCKHEED PLATING AREAS, SPRAY PAINT BOOTHS, AND DEGREASERS (7,20,21)

Building No.	Plating Areas	Spray Paint Booths	Degreasers
041	0	3	0
071	1	4	0
076	0	1	1
103	1	0	4
113	0	0	4
130	0	0	1
136	0	1	0
141	0	1	0
150	1	1	1
151	1	7	11
152	0	2	0
153	1	5	7
153A	0	1	0
155	0	1	0
159	0	1	0
159C	0	1	0

Table 1 (Cont.)

LOCKHEED PLATING AREAS, SPRAY PAINT BOOTHS, AND DEGREASERS (7,20,21)

Building No.	Plating Areas	Spray Paint Booths	Degreasers
170	1	4	2
174	0	6	0
181	0	1	0
182	1	8	5
183	0	0	1
188	0	1	0
195B	0	1	1
562	0	0	1

4.4 ANDCO TREATMENT UNIT (Central Wastewater Treatment Plant)

Unit Description: The Andco treatment unit, which is located in Building 114, is used to pre-treat rinsewaters, wastewaters, and other process-related solutions from etching, chemical milling, and plating operations prior to discharge to the POTW. Two treatment activities occur in this unit 1) neutralization of liquid corrosive wastes in conjunction with precipitation of heavy metals, and 2) electrochemical reduction of hexavalent chromium to trivalent chromium. In addition to the actual Andco treatment unit, the equipment associated with the treatment process consists of the following: transfer pipelines for plating wastewater from the buildings where plating operations occur (Buildings 071, 103, 150, 151, 159, 170, and 182), two 18,000-gallon aboveground storage tanks, bulk raw material tanks for caustic soda and sulfuric acid (used for pH adjustment), day tanks for caustic soda and sulfuric acid, and a feed tank for pH adjustment. Treated wastewater is routed to the clarifier, sludge thickening tank, and filter press (2,12,22).

Date of Start-up: Officially began operation in 1986.

Date of Closure: The unit is still in operation.

Waste Managed: Wastewater streams contain heavy metals, acidic and alkaline wastes not containing metals, and spent or out-of-specification process solutions (2,14). Sludge generated from wastewater treatment is stored at a centralized accumulation area (5). See section 4.8.

Release Controls: The treatment unit is the primary containment. Secondary containment consists of a cement floor with cement berming (22). Refer to Appendix B for a photograph of the unit and the containment features.

History of Releases: No known releases.

4.5 HAZARDOUS MATERIAL PROCESSING UNIT (HMPU)

Unit Description: This unit, which is located in Building 114, is designed as an upgrade to the existing Andco treatment unit. The liquid wastes to be treated are collected in three 13,000-gallon polyethylene tanks prior to treatment. The treatment unit consists of a 6,000-gallon primary reactor tank where plating rinsewater undergoes chemical reduction and pH adjustment. From the treatment tank, rinsewater is routed to the clarifier, sludge thickening tank, and filter press (Unit 4.6). Treated water is subsequently collected in the equalization pond prior to discharge to the POTW (2,14,22).

This treatment unit was designed to incorporate a new wastestream resulting from new plating operations which will be conducted in Building 071. Plating rinsewater from Building 071 will contain higher metal concentration than rinsewater which has been generated at the site in the past. Additionally, the treatment unit is designed to handle larger quantities of plating wastewater (7,400 gallons of liquid waste per batch). Plating waste is currently generated at Buildings 170, 150, 103, and 182. Plating operations in Buildings 103 and 182 are scheduled for closure once new plating operations in Building 071 are brought on line (7,14,22).

Date of Start-up: The first trial batches were treated the week prior to the site visit (October 8-12, 1990) (22).

Date of Closure: The unit is currently in operation.

Waste Managed: Wastewater streams contain heavy metals, acidic and alkaline wastes not containing metals, and spent or out-of-specification process solutions (2,14). Sludge generated from wastewater treatment is stored at a centralized accumulation area (5). See section 4.8.

Release Controls: All tanks and vessels are above ground. The secondary containment system for the entire treatment area, which houses both treatment units, consists of steel-reinforced concrete and the area is bermed with a reinforced concrete dike coated with epoxy to minimize corrosion (14).

History of Releases: There have been no known instances of releases.

4.6 CLARIFIER/THICKENING TANK/FILTER PRESS

Unit Description: This unit is located in Building 114. The treated water, containing insoluble precipitate from both the Andco Treatment Unit (Unit 4.4) and the Hazardous Waste Processing Unit (Unit 4.5), is routed to the clarifier. The underflow from the clarifier is pumped to the thickening tank. Finally, the underflow from the thickening tank is pumped to a filter press where final solids separation and concentration occur. The resulting filter cake of insoluble metal hydroxides is placed into lined drums and shipped off site within 90 days. Effluent water overflowing the clarifier, thickening tank, and filter press is discharged to the equalization ponds (Unit 4.10) (2,22).

Date of Start-up: 1986.

Date of Closure: The unit is currently in operation.

Waste Managed: Metal hydroxide sludge and treated wastewater.

Release Controls: All tanks and vessels are above ground. The containment system for the entire treatment area consists of steel-reinforced concrete and the area is bermed with a reinforced concrete dike coated with epoxy to minimize corrosion (14).

History of Releases: There have been no known instances of releases.

4.7 CYANIDE DESTRUCTION UNIT

Unit Description: The cyanide destruction unit located in Building 114 is designed as a totally enclosed treatment system to reduce emission of cyanide gases using a sodium hydroxide scrubber system. Additionally, the unit has a cyanide detection system to monitor any potential cyanide emissions. Chemicals used in the treatment process include sodium bisulfite and magnesium hydroxide (22).

Date of Start-up: The cyanide destruction unit has been completed but is not in use at this time nor has it been used in the past. Lockheed requested a variance from DHS to operate this unit without a RCRA treatment facility permit, but was denied. Lockheed has subsequently submitted an operation plan to the DHS for this unit. No permit (RCRA or other) has yet been issued (14,22).

Date of Closure: This unit is not yet in operation.

Waste Managed: This unit will manage cyanide-contaminated rinsewater resulting from on-site metal plating operations.

Release Controls: The cyanide destruction unit is situated in a concrete-floored and bermed structure which is within a concrete-floored, bermed containment area. The containment area also contains storage tanks containing sodium bisulfite and magnesium hydroxide. The concrete in this containment area utilizes an epoxy coating to minimize corrosion (14,22). Refer to Appendix B for a photograph of the treatment unit and associated containment features.

History of Releases: There have been no known instances of releases.

4.8 GENERATOR ACCUMULATION AREA/LOADING DOCK

Unit Description: Lockheed has constructed the generator accumulation area at Building 114 that serves the facility as the primary hazardous waste collection area for the facility. Lockheed has designed a system where all drums and containers are issued to the individual hazardous waste generation points from a primary distribution area. These drums and containers are subsequently collected and hauled to the generator accumulation area where the hazardous materials are sorted and liquid wastes are segregated into separate bermed areas according to hazardous

properties and chemical compatibilities. The hazardous materials in other containers are generally sorted and repacked for shipment. The system has been designed by Lockheed in order to ensure that hazardous waste is not stored on site for longer than 90 days (6,22).

There is a loading dock associated with the generator accumulation area which is used when hazardous materials are brought to the accumulation area or shipped off site. A handtruck is used to move material within the accumulation area (22).

Date of Start-up: Approximately 1985 (22).

Date of Closure: The storage area is still in operation.

Waste Managed: All of the hazardous materials generated at the Lockheed Plant One facility, which are then stored in drums or transportable containers, are temporarily stored at the generator accumulation area prior to being shipped off site. Wastes include spent solvents, metal hydroxide sludge, oil bath residues, mixed oil, copper cyanide solution, waste compressed gases, and all wastes associated with hazardous materials handling (23).

Release Controls: The entire accumulation area is sloped and diked to contain any liquids which may be spilled from hazardous waste containers and also to prevent water from outside the accumulation area from entering. The accumulation area is paved with concrete (14,22).

History of Releases: There have been no known instances of releases.

4.9 EVAPORATION PONDS

Unit Description: The two evaporation ponds were constructed by Lockheed in order to reduce the volume of contaminated wastewater which had to be hauled off site. Process solutions and spilled wastes from metal plating operations, as well as cooling tower blowdown water, were collected in these ponds, and standing liquid was allowed to evaporate. The remaining metal hydroxide sludge was pumped once a year and hauled off site. Together, the ponds had a total capacity of approximately 950,000 gallons (approximately 1,900 cubic yards) (16).

Date of Start-up: June 1983.

Date of Closure: September 1985.

Waste Managed: Wastewater streams containing heavy metals (cadmium, chromium, cobalt, copper, and nickel), acidic and alkaline wastes not containing metals, and spent or out of specification process solutions (2,14).

Release Controls: The ponds were double-lined with hypalon and had leachate collections systems (41). Refer to Appendix B for a current photograph of a closed evaporation pond.

History of Releases: In June 1984, leachate was discovered to be discharging from the west evaporation pond's leachate line. Soil sample analyses showed levels of copper ranging from 375 parts per million (ppm) to 1,600 ppm, and chromium levels ranging from 115 ppm to 140 ppm. Contaminated sand, gravel, and clay were removed and transported to an unspecified location. Additionally, the area around the leak was flushed with water to remove remaining soluble metals. The leak was subsequently repaired and the pond restored to service (41).

4.10 EQUALIZATION PONDS

Unit Description: The two ponds were designed for equalizations and stabilization of rinsewaters generated from chemical process facilities on site (8,22).

Date of Start-up: June, 1983.

Date of Closure: The ponds are currently in use, however, Lockheed plans to close the ponds and replace them with aboveground tanks (8,22).

Waste Managed: Waste streams managed at the equalization ponds includes cooling tower blowdown as well as wastewater generated from on-site chemical etching and milling, anodizing, conversion coating, printing of circuit boards, electroless plating, and plating with common and precious metals. Wastewater generated at the site from the above processes consists of diluted wasted from rinse tanks, quench waters, floor drainage, and contaminated-area drainage from the eight chemical processing facilities on site. The rinsewater includes low concentrations of oils and organics. Additionally, the ponds are used to hold water treated at the on-site treatment units prior to discharge to the POTW. Together, the two ponds have a total capacity of 950,000 gallons (approximately 1,900 cubic yards) (8,22). Refer to Appendix B.

Release Controls: The two ponds are artificially lined with hypalon (5).

History of Releases: There have been no known releases.

4.11 TRANSPORTABLE TREATMENT UNIT (TTU)

Unit Description: The TTU is a mobile treatment unit which is contained within a small trailer. The treatment unit can be used at any location at the Lockheed site to treat hazardous waste generated from on-site operations. To date, the unit has only been used for waste neutralization prior to discharge to the POTW and has not been used to treat hazardous waste. The TTU is primarily used at Building 195B to treat cooling water from laboratory activities that is above the discharge limit. Cooling water is collected in a 1,500-gallon underground tank at Building 195B prior to treatment with the TTU. Treated water is discharged directly to the POTW. The TTU is permitted for use 180 days per year. This unit is stored at Building 114 when it is not in use (22).

Date of Start-up: Unknown.

Date of Closure: This unit is still in operation.

Waste Managed: To date, the TTU has only been used at Lockheed to adjust wastewater pH (22).

Release Controls: The primary containment is the actual treatment unit. Secondary containment consists of berming around the periphery of the trailer. The berm is artificially lined (22). Refer to Appendix B for a photograph of the TTU and the containment features.

History of Releases: There have been no known releases.

4.12 BUILDING 14E

Unit Description: This building was used prior to 1986 for hazardous waste storage. The building was torn down and Building 041 has since been built on the site. Building 041 is currently a maintenance building for the Lockheed facility (22).

Date of Start-up: Unknown.

Date of Closure: The site has not been used for hazardous waste storage since approximately 1986. Lockheed applied for clean closure in 1987 which was not granted at the time of this report (22).

Waste Managed: All hazardous materials generated from on-site operations.

Release Controls: The building has been torn down; therefore, FIT was not able to determine the type of release control measures used at this unit.

History of Releases: Analyses of soil samples taken from around Building 14E detected up to 200 micrograms per kilogram (µg/kg) of trichloroethylene (TCE). According to Lockheed, soil contamination around the former storage area has been cleaned up and the facility has applied to the City of Sunnyvale and DHS for clean closure (22).

4.13 CYANIDE-DESTRUCTION UNIT (BUILDING 179)

Unit Description: The cyanide-destruction unit located at Building 179 consisted of two mixing tanks as well as storage tanks for caustics and acids, as well as a chlorine cylinder used in the treatment process. The treatment process consisted of reducing pH, adding chlorine, and subsequently re-neutralizing the wastewater prior to discharge to the equalization ponds (22,24).

In addition to Building 179, Buildings 103 and 151 also had associated cyanide-destruction units used for on-site segregation and treatment of cyanide-laden wastewater prior to discharge to the treatment facility (24).

Date of Start-up: Approximately 1985 (22).

Date of Closure: Approximately 1989 (22).

Waste Managed: Cyanide-contaminated wastewater from on-site plating operations (24). Sludge generated from this unit will be stored at a centralized accumulation area (5). See section 4.8.

Release Controls: The unit was dismantled at the time of FIT's site inspection. The unit appeared to have been contained within a fenced area adjacent to Building 182. It is not apparent whether or not the unit was secondarily contained (22). Refer to Appendix B for a photograph of the area where the cyanide destruction unit was formerly located.

History of Releases: There have been no known releases.

4.14 NEUTRALIZATION UNIT

Unit Description: The neutralization unit is located in Building 113. This building is used by Lockheed to neutralize wastewater generated from the circuit board manufacturing operation at Building 113. The three-staged unit uses sulfuric acid and a caustic to adjust the pH of wastewater generated from operations at Building 113. Treated water is discharged directly to the POTW (22).

Date of Start-up: Unknown.

Date of Closure: This unit is currently in operation.

Waste Managed: Acidified and caustic wastewater is managed by this unit. Sludge generated from this unit is stored at a centralized accumulation area (5). See section 4.8.

Release Controls: The neutralization unit is concrete-bermed to contain any waste which may be spilled during operation (22). Refer to Appendix B for photographs of the neutralization unit and the containment features.

History of Releases: There have been no known releases.

4.15 AREAS OF CONCERN

After groundwater contamination was identified at the site, Lockheed hired a consultant to conduct a site-wide survey of potential contaminant sources. The survey included visits to many of the chemical use and storage areas on site, interviews with Lockheed employees, examination of aerial photographs, and review of previous site investigations. The following areas were identified as potential pollution sources where contaminated soils might be present: the stormwater drainage ditch east of Building 170 (Storm Ditch 002); a sump in Building 181; sumps and beryllium shop area at Building 182; a sump at Building 179; the north side of Building 103; a waste oil tank at Building 187, a waste oil tank

at Building 109; and the chemical storage yard at the northeast corner of Building 151 (3,25,26).

The following sections describe specific identified areas at the Lockheed site where actual soil contamination has been discovered and characterized as of 1990.

4.15.1 Building 170/Storm Ditch 002

Building 170 was constructed in 1968 and has been used for metal processing and etching. Industrial activities conducted within the building include machining, lab testing, manufacturing development, adhesive and epoxy bonding, painting, silicone priming, component inspection, and component fabrication and sub-assembly. There are several chemical storage and waste management areas associated with Building 170 including underground and aboveground chemical storage tanks, clarifiers, and chemical storage areas. Chemical material handled at the site include waste oils, chemical milling solutions, steam cleaning liquids, metal process cooling water, sodium chloride and sodium nitrate solutions, titanium, beryllium, vanadium, TCA, PCE, and waste plating solution and rinsewater (25).

A stormwater drainage ditch, designated stormwater ditch 002, is located approximately 50 feet east of Building 170. This channel empties into the Lockheed Channel which runs along the northern boundary of the site. There is no barrier to inhibit water in the channel from flowing into the wetlands located on the Lockheed property. In addition, water from the Lockheed Channel is pumped into Guadalupe Slough which is a habitat for several federally-listed endangered species (see Section 5.3) (1,22,26).

Surface drainage from the asphalt surface on the northeast side of the building collects in a low area and is periodically manually released into the stormwater ditch using a sump pump. Analyses of soil samples collected from stormwater ditch 002 has shown up to 500 mg/kg of beryllium. The Total Threshold Limit Concentration (TTLC) value for beryllium is 75 mg/kg. Beryllium-contaminated soil has been removed from the stormwater channel, as well as around Building 170, at various times since May 1987 when the contamination was first detected. However, it does not appear that the northern extent of contamination has been determined in the stormwater channel, nor has the potential effect on neighboring wetlands been evaluated (25).

4.15.2 Building 181

Located south of Building 181 is a deep silver retention sump, comprised of three adjacent brick-lined sumps connected by piping. This sump received wastes from a former materials testing lab located at Building 181. Waste materials which may have been discharged to the sump include photographic development chemicals, used hydraulic fluids, and solvents. Liquid samples were collected from the sump in November 1987. Analyses indicated the presence of several metals including silver (810 ppm), beryllium (0.26 ppm), cadmium (17.6 ppm), chromium (940 ppm), and copper (12 ppm). Additionally, methylene chloride (19 parts per billion [ppb])

was detected in the sump. Soil samples taken near the sump in May 1988 indicated 8 ppm m-xylene and 8 ppm o/p-xylene in the soils (27).

4.15.3 Building 182

4.15.3.1 Former Beryllium Shop

A beryllium shop area was formerly located in Building 182. This shop had an elevated floor and contained plating/etching tanks and a degreaser. Spills of less than 5 gallons have reportedly occurred 10 to 15 times per year during the shop's operation. Materials spilled included solutions containing beryllium, chromium, caustics, acids, and the solvents TCE and TCA (27).

4.15.3.2 Acid Retention Sump

The acid retention sump is located south of Building 182. The sump may have received wastes from the former beryllium shop. The sump is constructed of concrete and measures 6 feet by 3 feet by 6 feet. Wastes which may have been released to the sump include beryllium, chromium, caustics, acids, and solvents (TCE and TCA). Analyses of liquid samples taken from the sump in October and November 1987 indicated the presence of trans-1,2-dichloroethene (110 ppb), acetone (4,500 ppb), 2-propanol (220,000 ppb), oil and grease (0.11 ppm), as well as silver, beryllium, and chromium in low concentrations. Soil samples taken near the sump in June 1988 did not indicate the presence of volatile organic compounds (VOCs). Results reported for metals analyses showed levels well below the TTLC (27).

4.15.3.3 Three Metal Process Waste Sumps

The three metal process waste sumps are located south of Building 182. The three sumps received plating and etching wastes from the plating shop and the former beryllium shop in Building 182. All three tanks are suspected to have leaked. Spills have severely corroded the asphalt around the easternmost sump. Soil samples collected near the sumps in June 1988 indicated the presence of elevated levels of several VOCs and metals (27).

4.15.4 Building 179 Sump

A sump at Building 179 is suspected of having received periodic overflow from two of the metal process waste sumps in building 182. This 600-gallon sump is not lined (27).

4.15.5 Steam Cleaning Basin

This basin is located south of Building 182. The basin is concrete-lined and measures 4 feet by 5 feet by 3 feet. The basin was used to collect steam-cleaning wastes including paint, oil, grease, solvents (TCE and TCA), and machine coolant (cutting oil). The basin was reportedly sealed in 1986 and the condition of the concrete is unknown (27).

4.15.6 Building 187 Waste Oil Tank

The 3,000-gallon underground waste coolant oil tank was removed in April 1987. A sample of the groundwater contained within the excavation was analyzed for VOCs and hydrocarbons. Results of the VOC analyses indicated levels of tricholorofluoromethane, 1,1-dichloroethane, 1,1-dichloroethylene, TCA, TCE, and tetrachloroethylene in concentrations exceeding DHS Action Levels for drinking water. Approximately 600 gallons of groundwater contained in the excavation was pumped out, drummed, and disposed of. Analyses of several soil samples taken near the site in May 1987 indicated contamination with up to 96 ppm VOCs. Approximately 51.5 cubic yards of visually suspect soil was removed from the excavation and disposed of off site. The excavation was backfilled and capped with asphalt on May 14, 1987 (27).

In May, June, and September 1988, soil samples were collected from the soils around the former waste oil tank. Soil containing petroleum hydrocarbons in concentrations greater than 100 ppm was excavated and removed in March 1989. The excavation extended to depths between 7.5 and 13 feet bgs. Confirmation soil samples were collected from the base of the excavation. Petroleum hydrocarbons were not detected in any soil sample (detection limit of 5 ppm). Other VOCs were not analyzed for during the remedial event. Excavated soil was deposited on an asphalt pad and covered with plastic, pending planned bioremedial activities. The excavation was backfilled and paved in March 1989 (27).

5. HRS FACTORS

The revised Hazard Ranking System (HRS) is a scoring system used to assess the relative threat associated with actual or potential releases of hazardous substances from sites. It is the principal mechanism EPA uses to place sites on the National Priorities List (NPL). FIT has evaluated the following HRS factors relative to this site.

5.1 WASTE TYPE AND QUANTITY

The Lockheed site handles large quantities of hazardous materials and generates a large quantity waste material as part of the facility's aerospace testing, manufacturing, and research and development activities. The materials and wastes formerly and presently used on site include aqueous heavy metal solutions, cyanide solution, acids, waste oils, and organic halogenated and non-halogenated solvent compounds.

The main hazardous waste accumulation area and waste treatment facilities, which are located at Building 114, appear to have been designed with adequate containment to contain potential spillage of hazardous materials. The FIT inspection indicated that these areas have primary containment within a concrete, bermed, secondary containment structure. Prior to transfer to the hazardous waste accumulation area, liquid hazardous wastes are stored near the point of generation in drums on secondary containment pallets which are designed to contain potential drum spillage. Solid hazardous materials are stored in plastic containers prior to transfer to the hazardous waste accumulation area

where wastes are sorted and lab-packed for off-site disposal. Aqueous wastes are directly transported via piping to the waste treatment facility (6,22).

Due to the size and complexity of the site as well as the limited scope of the Preliminary Assessment, FIT was not able to completely access and inspect all area associated with waste generation and storage at the facility. As a result, waste quantity information documenting areas of inadequately contained hazardous waste for the site is incomplete. Section 4 describes most of the waste management unit and types of wastes managed. Section 4.15 describes areas at Lockheed where there are documented releases of contaminants to the environment by Lockheed.

5.2 GROUNDWATER

5.2.1 Hydrogeology

The Lockheed site is located within the central portion of the Santa Clara Valley. Soils beneath the site consist of both alluvial and sedimentary deposits of unconsolidated clay, silt, sand, and gravel. The mix of soil materials is due to a combination of alluvial action and tidal deposition (26).

Three transmissive zones have been identified beneath the Lockheed site. The shallowest water-bearing unit generally consists of 5- to 20-foot thick sequences of moderate to highly permeable materials encountered from 5 to 25 feet bgs. The second transmissive zone is generally characterized by 5- to 15-foot thick sequences of moderate to highly permeable materials encountered from 25 to 55 feet bgs. Thin units of low permeability soils are interbedded within the first and second transmissive zones. The third, and final, transmissive zone is characterized by 5- to 15-foot thick sequences of moderately permeable materials which are separated by 5- to 15-foot thick units of low permeability materials. The third transmissive zone is encountered at a depth interval of 100 to 160 feet bgs. Groundwater flow beneath the Lockheed site appears to be toward the northeast in all three transmissive zones. The hydraulic gradient in the first two zones is between .006 and .007 feet per foot (ft/ft) in the southern portion of the site and between .002 and .003 ft/ft in the northern area of the site. The average hydraulic gradient in the third transmissive zone, based on limited data, is approximately .0009 ft/ft (26).

The first and second transmissive zones appear to be hydraulically interconnected over much of the Lockheed site (26). Some salt water intrusion has been noted in the two uppermost zones (28). Materials encountered between the second and third transmissive zones, at depths between 55 and 100 feet bgs, consist mainly of low permeability materials. Sequences of thin lenses of moderate permeability are often observed to be interbedded with the low permeability materials within this depth interval. These lenses are saturated and, therefore, are referred to as the intermediate zone and have the potential to provide a possible lateral migration pathway for chemicals (26).

The potential for migration of contaminants from the first two transmissive zones to the third transmissive zone is limited by the upward hydraulic gradient existing between the second and third zones. In general, the large percentage of low permeability materials present within the depth interval of 55 to 100 feet bgs may provide a hydraulic separation between the two interconnected upper zones and the third transmissive zone. However, there are documented instances where old irrigation wells have provided a conduit for contaminant migration to the third transmissive zone within 2 miles of the Lockheed site. Although this phenomenon has been observed upgradient (southwest) of Lockheed, all three transmissive zones will be considered interconnected for the purposes of this investigation. The proposed HRS model does not take groundwater gradient into consideration when looking at groundwater contamination. At present, work is being done to seal all abandoned deep wells in the area (28).

For the purposes of this evaluation, the three transmissive zones are considered to be interconnected. The Lockheed site is less than 2 miles from the Fairchild-Mountain View well #1C which is a documented point of aquifer interconnection (29). Additionally, contamination of TCA has been noted in the confined aquifer beneath the Lockheed site (Refer to Section 5.2.3) (26). The net precipitation for the Sunnyvale area is approximately 6 inches (30,31).

5.2.2 Groundwater Use

The City of Sunnyvale utilizes nine local groundwater wells to supplement water obtained from Hetch Hetchy reservoir and the Santa Clara Valley Water District. The closest City of Sunnyvale well is located approximately 1.5 miles south of the southern boundary of the Lockheed site. Water from this well is part of a blended system which services the entire population of Sunnyvale, approximately 118,000 people (32,33,42). However, groundwater provides only 25 percent of the drinking water used by the Sunnyvale system while the Hetch-Hetchy reservoir supplies 50 percent of the drinking water used by the system (42).

The City of Mountain View operates a number of municipal wells, three of which are located approximately 2 miles southwest of the site. The closest Mountain View municipal well, Well #18, is approximately 1.7 miles southwest of the southern boundary of the Lockheed site. The City of Mountain View wells all draw from the third, confined, transmissive zone and supply water for drinking, commercial, and industrial uses (28). The population of Mountain View is 61,000 people, however, the Mountain View water system serves a daytime population of 120,000 during business hours. Approximately 15 percent of Mountain View's water comes from groundwater wells which are blended with imported surface water (34).

The City of Mountain View is currently undergoing an investigation of a groundwater contamination plume within the first two transmissive zones which is in proximity to municipal wells 18, 19, and 20. The plume, consisting of organic solvent contamination, has extended over an area of approximately 2 square miles in the northern portion of the city. To date, contamination has not been observed in the three municipal wells (28).

5.2.3 Site Groundwater Contamination

As part of Site Cleanup Requirements, Order No. 88-013 issued by RWQCB in January 1988, Lockheed has conducted a three-phased study to characterize the site's hydrogeology and define groundwater contamination. The results of this study indicate that VOCs, chromium, and nitrate from a number of sources are present in the first and second transmissive zones at concentrations which exceed regulatory requirements. In the first two transmissive zones, the maximum levels of VOCs include 950 micrograms per liter (µg/L) TCA, 1,900 µg/L TCE, 2,900 µg/L Freon 113, and 29 µg/L PCE. Chromium has been detected in the first two transmissive zones at concentrations up to 1,100 µg/L (17,26).

TCA has been detected in one on-site monitoring well perforated in the third transmissive zone at concentrations up to 0.9 µg/L. The source of TCA may be off site and upgradient because there does not appear to be a source to groundwater of TCA in the first two transmissive zones upgradient of this well at the Lockheed site (26).

Several separate VOC and chromium plumes have been identified in the first two transmissive zones at the Lockheed site. In some areas, groundwater contamination plumes appear to be directly attributable to Lockheed buildings. VOC and chromium plumes have merged in some places and the contaminants are traveling toward the eastern boundary of the site between Caribbean Avenue and Fifth Avenue (26).

5.3 SURFACE WATER

San Francisco Bay is the one main body of water within 3 miles of the Lockheed site (1). Tidal marshes and sloughs of the Bay form the northern border of the Lockheed facility. These wetlands are proposed for addition to the San Francisco Bay National Wildlife Refuge (35). The 2-year, 24-hour rainfall for the Mountain View area is approximately 2.5 inches (36).

There are two drainage ditches, labeled Storm Ditch 001 and Storm Ditch 002, at the Lockheed facility. Storm Ditch 001, located east of Building 175, receives both storm runoff as well as significant quantities of discharge from the site on a fairly consistent basis. Storm Ditch 002, located north and east of Building 170, is apparently used only for storm runoff and does not receive a significant quantity of flow on a consistent basis. Waters from these channels flow into wetlands located on the Lockheed site, adjacent to the wastewater equalization ponds. Stormwater runoff from the Lockheed site eventually drains to the Lockheed Channel which runs along the northern boundary of the site. This Channel is regulated by the Lockheed Pump Station located approximately 1,500 feet from the northeastern boundary of the site, adjacent to the City of Sunnyvale Landfill (see Figure 2). Water from the channel is pumped to the Guadalupe Slough at the southern boundary of San Francisco Bay (22,26).

The northern portion of the site, where the waste accumulation area and the Central Wastewater Treatment plant is located (Building 114), is within a 100-year floodplain. The 100-year high tide level determined by the U.S. Army Corps of Engineers for Moffett Field located west of the Lockheed site is 7.5 feet above mean sea level (MSL). The Lockheed facility has a levee which is 2.5 feet above MSL which runs along the northern boundary of the site. The Operations Plan for the permitted treatment facility documents that a maximum of 10,000 gallons of waste will be accumulated at the treatment facility before processing. If there is a flood warning, all hazardous sludges from the treatment process will be moved to higher ground and precautions will be taken to ensure that no hazardous materials remain at the treatment facility and all lines and processing equipment are flushed free of contamination (2,24).

The San Francisco Bay is used for commercial and recreational fishing, estuarine habitat, shellfish harvesting, fish migration, migratory waterfowl refuge, navigation, industrial service supply, water contact and non-contact recreation, and wildlife habitat (18). The tidal wetlands and sloughs adjacent to the Lockheed site are habitat for six federally-listed endangered species: the salt marsh harvest mouse (Reithrodontomys raviventris), the California clapper rail (Rallus longirostris obsoletus), the California black rail (Laterallus jamaicensis cotruniculus), the California brown pelican (Pelecanus occidentalis californicus), the American peregrine falcon (Falco peregrinus anatum), and the snowy plover (Charadrius alexandrinus nivosus). Additionally the adjacent wetlands support one threatened plant species, the marsh gum plant (Grindelia humilis)(37,38,39).

The primary commercial fishing conducted in the South San Francisco Bay is for fishing bait such as shrimp and small fish. Some commercial herring fishing is conducted in the south bay north of San Mateo Bridge and south of Hunters Point and the Alameda Naval Air Station. The South Bay is also used for recreational clamming along the mud flats on the western side of the bay (39,43).

5.4 AIR

The Bay Area Air Quality Management District (BAAQMD) regulates all air emission sources at the Lockheed site. BAAQMD's main concerns are solvent usage and spray paint booths. The District has issued permits for individual degreaser units and spray paint booths (40).

Sections 4.10 and 4.11 describe areas of soil contamination at the Lockheed site. Many of the known areas of contamination have been remediated and capped with asphalt reducing the potential contamination to be released to air. However, there is a high potential that all areas of contamination at the site have not been identified at this time. Additionally, the lateral extent of beryllium contamination in Storm Ditch 002, east of Building 170, has not been completely identified and is accessible to the environment (25,27).

The land in the vicinity of the Lockheed site is used for commercial, industrial, institutional, and single/multiple family residential

purposes. Adjoining the site on the west and southwest is the Moffett Field Naval Air Station, which preceded Lockheed in the area by at least 25 years. To the north are the brine ponds of Leslie Salt Company which were constructed in the late 1950s. To the northeast in a sanitary landfill. To the east lie office buildings which displaced farmland between 1974 and 1980. To the south and southeast across Mountain View-Alviso Road are residential neighborhoods, trailer parks, and small office and commercial buildings which were constructed between 1953 and 1980 (27).

The nearest residence is located in the Orchard Gardens development less than 0.25 miles southwest of Lockheed, north of U.S. Highway 101. Additionally, there is a mobile home park located east of the Orchard Gardens development. Except for the above areas and a new 600-unit apartment complex located at Morris Avenue and Wadell Street, the majority of the Sunnyvale population resides south of El Camino Real (32). There are approximately 21,000 employees at the Lockheed site (6). There are six federally designated endangered species that inhabit the area of the site (refer to Section 5.3, Surface Water Pathway) (37,38).

5.5 ON-SITE

As stated in Section 5.4, Air Pathway, the Lockheed site is located in an area used for commercial, industrial, institutional, and single/multiple family residential purposes. The closest residence is located in the Orchard Gardens development less than 0.25 miles southwest of the site, north of U.S. Highway 101. Additionally, there is a mobile home park located east of the Orchard Gardens development. Except for the above areas and a new 600-unit apartment complex located at Morris Avenue and Wadell Street, the majority of the Sunnyvale population resides south of El Camino Real (32). Sections 4.10 and 4.11 describe areas of soil contamination and uncontained hazardous materials at the Lockheed site.

The Lockheed site is entirely fenced with 24-hour security. Many of the operations at the site are classified; therefore, Lockheed takes stringent security measures to monitor the movement of people throughout the facility and passes are required (22). Aside for the 21,000 on-site employees, there is a low potential for nearby residents to come in contact with hazardous materials at the Lockheed site (6).

6. SUMMARY OF FIT INVESTIGATIVE ACTIVITIES

6.1 AGENCIES CONTACTED

Prior to the site reconnaissance visit, FIT contacted individuals with DHS Surveillance and Enforcement/Permitting, RWQCB, BAAQMD, City of Sunnyvale Fire Prevention Bureau, and City of Sunnyvale Public Works Department. These agencies provided FIT with information on recent site inspections, soil sampling and groundwater monitoring, groundwater use, and permitting status.

6.2 RECONNAISSANCE OBSERVATIONS

A site inspection of the Lockheed site was conducted Wednesday, October 17, 1990 by FIT members Kimberly Hall and Howard Edwards. The inspection began with a meeting at 9:00 AM in Building 101 located at 1111 Lockheed Way in Sunnyvale, California. The information obtained during the site meeting included site history, waste management practices and disposal methods, and facility processes (22).

The meeting was followed by a facility tour. Due to the size of the site, FIT focused the tour on areas where facility hazardous wastes are treated or stored. The tour included the two former evaporation ponds, the two waste equalization ponds, the Andco treatment unit, the hazardous material processing unit, the cyanide-destruction unit, and the waste accumulation area located at Building 114, the wastewater neutralization unit at Building 113, the transportable treatment unit (TTU), and the former cyanide-destruction unit at Building 179. Additionally, FIT observed examples of site degreasing, metal plating, and spray painting operations located in Building 182. Due to the size of the facility and the large scope of activities which generate hazardous waste, FIT was not able to observe all areas where hazardous materials are generated or managed (22).

As part of the tour, FIT utilized a Lockheed staff photographer to photodocument the SWMUs that were observed. In addition, FIT observed and photodocumented the wetlands located on the Lockheed site which are adjacent to Storm Ditch 001 (22).

7. EMERGENCY RESPONSE CONSIDERATIONS

The National Contingency Plan [40 CFR 300.415(b)(2)] authorizes the U.S. Environmental Protection Agency to consider emergency response actions at those sites which pose an imminent threat to human health or the environment.

There is no apparent need for emergency response at this time. Soil and groundwater contamination is currently being characterized by the facility. Soil and groundwater sampling activities, as well as facility closure and remedial actions, are being monitored by DHS and RWQCB. Current waste management practices appear to be adequate and the site is secured from public access (22).

8. SUMMARY OF HRS CONSIDERATIONS

The Lockheed Missiles and Space Company, Inc. site, located at 1111 Lockheed Way in Sunnyvale, California, develops and manufactures satellite and missile components for the aerospace industry. The facility occupies 660 acres and, except for a 48-acre parcel in the middle of the facility, is owned by the Lockheed Corporation of Burbank, California. The 48-acre parcel is owned by the U.S. Navy.

On January 20, 1988, the Regional Water Quality Control Board adopted Waste Discharge Requirements Order No. 88-13 which has required Lockheed to perform a site-wide comprehensive investigation to define the local hydrogeologic conditions and the lateral and vertical extent of soil and groundwater pollution at the facility. Several contamination plumes containing high levels of chromium and volatile organic compounds have been identified in the shallow groundwater zones at the facility. In addition, areas of soil contamination have been identified and remediated around several site buildings.

The on-site storm drainage channels lead directly into the tidal wetlands and the Guadalupe Slough. This area is habitat for several federally designated endangered species. Contamination from the site resulting from spills or from documented beryllium contamination in Storm Ditch 002 may have affected the on-site wetlands or off-site tidal sloughs and wetlands. Confirmation sampling does not appear to have been conducted to determine the extent of beryllium contamination in Storm Ditch 002, nor has sampling been conducted to characterize potential contamination in Storm Ditch 001 or in the wetlands.

The significant factors of the HRS pertaining to the Lockheed site are:

- A release of chromium and volatile organic compounds to shallow groundwater zones beneath the site has been documented;

- There is a high potential for a release to surface water from the site;

- Surface water runoff from the site drains into nearby wetlands and sloughs which are habitat for several federally designated endangered species; and

- High toxicity of hazardous waste materials generated at the facility.

9. EPA RECOMMENDATION

	Initial	Date
No Further Remedial Action Planned under CERCLA	PV	3/19/91
Higher-Priority SSI under CERCLA		
Lower-Priority SSI under CERCLA		
Defer to Other Authority (e.g., RCRA, TSCA, NRC)		

Notes:

This site is being evaluated under the RCRA Pgm (EPI).

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44. California Department of Health Services (DHS), Toxic Substances Control Division, Surveillance and Enforcement Inspection Report, March 24, 1987.

APPENDIX A

CONTACT LOG AND REPORTS

PA/SI CONTACT LOG

Facility Name: Lockheed Missiles and Space Company, Inc.
Facility ID: CAD009125535

Name	Affiliation	Phone #	Date	Information
Doris Cruz	California Department of Health Services (DHS)		8/13/90	There is one file for the Lockheed-Sunnyvale site.
Dave Jansen	DHS	415-540-3868	8/15/90	See Contact Report.
Jim Seaver	Lockheed	408-742-0243	8/16/90	See Contact Report.
Sherri	Santa Clara County Health Department	408-299-6930	8/17/90	
Ron Staricha	City of Sunnyvale-Fire Prevention Bureau		8/17/90	See Contact Report.
Louis Goldsmith	CA Regional Water Quality Control Board (RWQCB)	415-464-1095	8/21/90	RWQCB certified closure of two ponds on June 29, 1987.
Masood Ghassemi	Lockheed	408-742-8167	9/26/90	
Harold Lips John Marvin	Bay Area Air Quality Management District	415-771-6000	9/27/90	See Contact Report.
Daisy Lee	DHS - Permitting	415-540-3736	10/4/90	Lockheed recently submitted an Operations Plan for the permitting of a cyanide-destruction system and a waste accumulation tank at Building 071.
Lyla Tang	RWQCB-Permitting	415-464-0884		See Contact Report.

he/lm&spi/clcr

CONTACT REPORT

AGENCY/AFFILIATION: California Department of Health Services		
DEPARTMENT: Toxic Substances Control Program		
ADDRESS/CITY: 700 Heinz Avenue, Building F, Berkeley		
COUNTY/STATE/ZIP: Alameda County, California 94710		
CONTACT(S)	**TITLE**	**PHONE**
1. Dave Jansen	Haz. Materials Specialist	415-540-3868
2.		
E & E PERSON MAKING CONTACT: Kimberly Hall		**DATES:** 8/15/90 9/24/90
SUBJECT: Site status		
SITE NAME: Lockheed Missiles and Space Company, Inc.		**EPA ID#:** CAD009125535

The most recent DHS inspection was conducted over a five-day period during January 1990. This inspection found numerous violations including storage of radioactive waste for longer than 90 days. Mr. Jansen observed 55-gallon drums labelled "magnesium thorium" stacked in an uncovered storage area on site. Lockheed stated that these drums contained borings and shavings of a magnesium thorium alloy. Alpha, beta, and gamma radiation readings at the drum surfaces was 0.5 milirem/hour. This waste may be eligible for RCRA under 40 CFR, Title 20 as a reactive or flammable solid. This issue is yet to be resolved with Lockheed. Currently, the radioactive waste is accumulated and then shipped to Tennessee where it is embedded in concrete. If the waste is found to be eligible under RCRA then this practice will pose several problems unless the Tennessee facility is permitted to receive RCRA waste and the cement treatment is found to be a RCRA treatment. The magnesium thorium waste is generally shielded by other metal wastes and does not likely pose a serious threat. Lockheed also handles uranium in one of the restricted access research and development buildings. This waste is controlled by the DHS, Environmental Health Division.

A pile of waste asbestos wrappings for pipes was noted during the inspection. Subsequent analysis found the waste pile to contain between 5 and 10 percent asbestos. A Lockheed contractor had removed the asbestos from a building and then failed to discard it properly.

The Andco treatment unit and associated storage area and transfer lines are the only state-permitted facilities at Lockheed. These are non-RCRA regulated. All waste is stored on site for less than 90 days. Waste is handled at accumulation areas which are scattered throughout

the facility. Subsequently all waste is hauled to the main storage area where it is kept (less than 90 days) until it can be hauled to an off-site disposal facility. No organics are handled in the treatment unit, only plating bath solutions.

Waste handling practices at Lockheed prior to 1980 are not documented.

There is a storage area for recyclable wastes. These wastes do not have to be handled as hazardous and are therefore stored on site for greater than 90 days.

The Lockheed storm drain leads directly into the tidal wetlands and slough area. DHS does not know of any sampling that has been conducted in the wetlands area bordering the Lockheed site.

Problems at Lockheed are often a result of contractors negligence. Contractors are present on site to decontaminate tanks, remodel buildings, install new equipment, and perform construction.

There is an oil recycling unit at Building 182 which recycles cutting oil for use in the buildings operations. DHS does not know where the waste from the recycling unit goes.

he/lm&spi/clcr

CONTACT REPORT

AGENCY/AFFILIATION: City of Sunnyvale		
DEPARTMENT: Public Works		
ADDRESS/CITY: Sunnyvale		
COUNTY/STATE/ZIP: Santa Clara County, California		
CONTACT(S)	**TITLE**	**PHONE**
1. Alex Sandigo	Sr. Public Works Meter	408-730-7560
2.		
E & E PERSON MAKING CONTACT: Kimberly Hall		**DATE:** 10/2/90
SUBJECT: Groundwater use		
SITE NAME: Lockheed Missiles and Space Company, Inc.		**EPA ID#:** CAD009125535

The City of Sunnyvale (Sunnyvale) utilizes groundwater to supplement water supplied by Hetch-Hetchy and the Santa Clara Valley Water District. Sunnyvale maintains one water supply system but pressure-regulating control valves along El Camino Street separate groundwater from municipal wells located north of El Camino from groundwater from municipal wells located south of El Camino.

The closest Sunnyvale municipal well to Lockheed is located at Sunnyvale Ave. and Arques Road approximately 1.5 miles south of the southern boundary of the site. Water from this well is mixed with water from Hetch-Hetchy and is part of the system which serves the population in the northern section of Sunnyvale.

The closest municipal well located in the part of the Sunnyvale system south of El Camino is the Losse Well at Jamestown and Bernardo. This well is approximately 2.8 miles southwest of Lockheed.

The entire Sunnyvale system has 274,077 service connections. The part of the Sunnyvale system north of El Camino serves mostly industrial areas. However, there are a few residential areas including the Orchard Gardens development and a mobile home park east and west of Borregas Avenue north of U.S. Highway 101. Additionally, there is a new apartment complex with approximately 600 units located at Morris Avenue and Wadell Street. The majority of the residential areas in Sunnyvale, and therefore the majority of the population, are located south of El Camino and served by the southern portion of the Sunnyvale municipal water system.

Lockheed has its own water service connection and is served strictly by water from Hetch Hetchy.

he/lm&spi/clcr

CONTACT REPORT

AGENCY/AFFILIATION: Lockheed Missiles and Space Company, Inc.		
DEPARTMENT: Environmental Permitting/Project Support		
ADDRESS/CITY: 1111 Lockheed Way, Sunnyvale		
COUNTY/STATE/ZIP: Santa Clara County, California 94089-3504		
CONTACT(S)	**TITLE**	**PHONE**
1. Kirk Willard	Supervisor	408-742-7661
2.		
E & E PERSON MAKING CONTACT: Kimberly Hall		**DATE:** 10/2/90
SUBJECT: Site information		
SITE NAME: Lockheed Missiles and Space Company, Inc.		**EPA ID#:** CAD009125535

Lockheed began operations at the site around 1957.

The Navy owns 48 acres in the middle of the Lockheed facility. Building 182 is located in this acreage. The property was sold to the Navy around 1958 for $1.00 and is part of the Naval Industrial Reserve Ordinance. The facility is termed a "government-owned, company-operated facility. All other property and buildings at Lockheed Facility One are currently owned by Lockheed.

BAAQMD, DHS, and RWQCB have agreed to allow Lockheed to operate the entire Facility One complex as one unit. Therefore, all regulatory actions and remedial work encompass the entire facility and Lockheed is the responsible party.

he/lm&spi/clcr

CONTACT REPORT

AGENCY/AFFILIATION: California Regional Water Quality Control Board		
DEPARTMENT: Permitting		
ADDRESS/CITY: 1800 Harrison Street, Oakland		
COUNTY/STATE/ZIP: Alameda County, California		
CONTACT(S)	**TITLE**	**PHONE**
1. Lyla Tang		415-464-0884
2.		
E & E PERSON MAKING CONTACT: Kimberly Hall		**DATE:** 10/22/90
SUBJECT: NPDES Permit Status		
SITE NAME: Lockheed Missiles and Space Company, Inc.		**EPA ID#:** CAD009125535

Lockheed was issued NPDES Permit #CA0005754, Waste Discharge Requirement (WDR) Order No. 76-75 in 1976. The permit covers site runoff which is channeled through four storm channels running from the south end of the property north to the Lockheed Channel and the wetlands bordering the property. Lockheed Channel runs from west to east along the northern property boundary and ends at a pump station where the water is pumped into Guadalupe Slough. As part of the permit, Lockheed is required to conduct quarterly testing at three locations, Storm Channels 001 and 002, and the Lockheed Channel pump station. This permit was updated in 1978 and has not been updated since that time. The permit used to cover the discharge of cooling water to the wetlands but Lockheed has since discontinued this practice.

RWQCB is considering transferring the responsibility for monitoring the surface water discharge from the site to the City of Sunnyvale. Currently, Lockheed is required to conduct oil and grease, pH, suspended matter, and bioassay testing.

he/lm&spi/clcr

CONTACT REPORT

AGENCY/AFFILIATION: Bay Area Air Quality Management District (BAAQMD)		
DEPARTMENT: Permitting and Enforcement		
ADDRESS/CITY: 939 Ellis Street, San Francisco		
COUNTY/STATE/ZIP: San Francisco County, California 94109		
CONTACT(S)	**TITLE**	**PHONE**
1. Harold Lips		415-771-6000
2. John Marvin	Inspector	
E & E PERSON MAKING CONTACT: Kimberly Hall		**DATE:** 9/27/90
SUBJECT: Permits		
SITE NAME: Lockheed Missiles and Space Company, Inc.		**EPA ID#:** CAD009125535

BAAQMD permits Lockheed's vapor degreasers, paint booths, and cleaning materials (solvents). Each unit is individually permitted. The facility is currently in compliance. An audit was conducted at the facility in January 1990.

For a copy of the audit report, a site plan, and a list of all air emission sources, send a letter to Milton Feldstein at 939 Ellis Street, San Francisco, 94109.

he/lm&spi/clcr

CONTACT REPORT

AGENCY/AFFILIATION: City of Sunnyvale		
DEPARTMENT:		
ADDRESS/CITY:		
COUNTY/STATE/ZIP:		
CONTACT(S)	**TITLE**	**PHONE**
1. John Linda	Public Works Supervisor	408-730-7500
2.		
E & E PERSON MAKING CONTACT: Janet Kaps		**DATE:** 7/2/90
SUBJECT: Well locations within 4 miles		
SITE NAME: Lockheed*		**EPA ID#:** CAD009125535

There are two wells located within 4 miles of 974 East Arques, the Schroeder well, at Arques and Schroeder, and the Industrial Water Plant well, at Wolfe and Kifer.

These are municipal wells which are part of a fully integrated supply system with approximately 30,000 metered service connections. The well system supplies all of the City of Sunnyvale with a population of 118,000.

Well water supplies 26 percent of municipal water, the remaining is supplied by the Hetch Hetchy Water Project.

These two wells are perforated from 250 to 400 feet bgs. They are drilled to 700 feet bgs and the pumps are at approximately 300 feet bgs.

* This contact report was originally prepared by E & E FIT for a RCRA Facility Assessment of the Hewlett Packard site (EPA ID# CAD069130995) on July 2, 1990.

he/lm&spi/clcr

CONTACT REPORT

AGENCY/AFFILIATION: City of Mountain View		
DEPARTMENT: Utilities Department		
ADDRESS/CITY: 231 North Whisman St., Mountain View		
COUNTY/STATE/ZIP: Santa Clara, California		
CONTACT(S)	**TITLE**	**PHONE**
1. Genevieve Fire	Engineer	415-966-6329
2.		
E & E PERSON MAKING CONTACT: Matthew Williams		**DATE:** 2/5/90
SUBJECT: Groundwater use in Mountain View		
SITE NAME: Lockheed*		**EPA ID#:** CAD009125535

Ms. Fire said that the city obtains approximately 15 percent of its water from groundwater wells, and that one well was approximately 2,000 feet from the Middlefield, Ellis, Whisman Study Area plume.

* This contact report was originally prepared by E & E FIT for a RCRA Facility Assessment for NASA Ames Research Facility ((EPA ID# CAD1899995034).

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CONTACT REPORT

AGENCY/AFFILIATION: State of California		
DEPARTMENT: Fish and Game		
ADDRESS/CITY: 411 Burgess Drive, Menlo Park		
COUNTY/STATE/ZIP: San Mateo County, California 94025		
CONTACT(S)	**TITLE**	**PHONE**
1. Paul Riley	Associate Marine Biologist	415-688-6362
2.		
E & E PERSON MAKING CONTACT: Kenyon A. Larsen		**DATE:** 8/21/90
SUBJECT: Commercial fishing and Recreational Clamming in So. S.F. Bay		
SITE NAME: Lockheed*		**EPA ID#:** CAD009125535

Mr. Riley stated that the primary commercial fishing conducted in the South San Francisco Bay is for fishing bait such as shrimp and small fish.

Mr. Riley mentioned that some commercial fishing is conducted in the south bay north of the San Mateo Bridge and south of Hunters Point and the Alameda Naval Air Station. Mr. Riley stated that a maximum of 10 percent of the 9,500 ton-per-year limit on herring might be caught south of Hunters Point or within 15 miles of the Redwood Shore Landfill site. The limit for herring is either reached or exceeded each year except for an occasional year when it is not reached.

Mr. Riley said that the south bay is also used for recreational clamming along mud flats on the western side of the bay. The Manila or Japanese little-neck clam (Tapes japonica) is the primary clam collected for food by humans. A 1981 report on recreational clamming estimated the use of the bay for clamming. Mr. Riley said that the report showed about six locations along the western edge of South San Francisco Bay that were used for clamming. The limit for clamming is 50 clams per person per day. There are roughly two pounds of clams per limit. There is a maximum of 900 user days for clamming in the south bay. Based on this data along with other data, an estimate of between 2,000 and 10,000 pounds of clams were caught in the south bay in 1981. Mr. Riley stated that this is a very rough estimate of recreational clamming in the south bay.

* This contact report was originally prepared by E & E FIT for a Listing Site Inspection for Redwood Shore Landfill (EPA ID# CAD982462343).

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CONTACT REPORT

AGENCY/AFFILIATION: City of Sunnyvale		
DEPARTMENT: Public Works		
ADDRESS/CITY: Sunnyvale		
COUNTY/STATE/ZIP: Santa Clara, California		
CONTACT(S)	**TITLE**	**PHONE**
1. Bill Weisend	Supervisor	
E & E PERSON MAKING CONTACT: Ayn Schmit, EPA Region 9		**DATE:** 7/24/84
SUBJECT: Location of Sunnyvale City wells		
SITE NAME: Lockheed*		**EPA ID#:** CAD009225535

There are 10 wells currently operating in thee Sunnyvale municipal water system. Information concerning well location and depth is as follows:

Table **

CITY WELL NAME	STATE WELL #	STREET LOCATION	DEPTH TO HIGHEST LEVEL OF PERFORATION	VOLUME* acre-feet/yr
Industrial Well	(6S/1W31B03)	SE Cor. Kifer & Wolfe	321′	815
Schroeder Well	(6S/2W25H01)	NE Cor. Schroeder & Arques	401′	597
Losse Well	(6S/2W35M01)	NE Cor. Bernardo & Arques	225′	663
Central Well	(6S/2W36A01)	SE Cor. Central & McKinley	08′	753
Hamilton Wells	(7S/2W02E01)	S of Syracuse between Bernardo & Cranberry	291′	801
Serra Well	(7S/2W11A01)	N Side of Serra Park	318′	823
Westmore Well	(7S/2W11G01)	Across St. from Homestead High School	260′	474
Wolfe/Homestead	(7S1W07F01)	NW Cor. of Dundee & Partridge	328′	106
			Total:	6800

he/lm&spi/clcr

* Information derived from a RCRA PA for A.C. Ball Company (EPA ID # CAD009225434) on July 24, 1984.

** From Santa Clara Valley Water District well production data for 1983.

he/lm&spi/clcr

CONTACT REPORT

AGENCY/AFFILIATION: Department of Fish and Game		
DEPARTMENT: Marine Biology		
ADDRESS/CITY: Menlo Park		
COUNTY/STATE/ZIP: California		
CONTACT(S)	**TITLE**	**PHONE**
1. Paul Riley	Marine Biologist	415-688-6340
2.		
E & E PERSON MAKING CONTACT: Laura Kadlecik		**DATE:** 1/9/91
SUBJECT: Commercial Fishery in Block 489		
SITE NAME: Lockheed*		**EPA ID#:** CAD009225535

Block 489 extends from the Oakland Bay Bridge to the southern tip of San Francisco Bay. In the southern end of the bay commercial fishing for bay shrimp and herring occurs. The halibut fishery does not extend to that end of the bay. The catch of bay shrimp in Block 489 during the month of November 1990 was 10,000 lbs. Herring catches are landed and weighed at several different locations in the bay that do not correspond to the catch blocks in which they were caught. For this reason, pounds of herring caught cannot be identified by block. The annual catch of herring from the entire San Francisco Bay in the 1989-90 season (December 1989 - March 7, 1990) was 9,000 tons.

The 15-mile target limit distance from the entrance of Moffett Channel into Guadalupe slough comprises about 27 percent of the catch block 489. Probably less than 5 percent of the herring caught from San Francisco Bay is from block 489.

Sport fishing also occurs in the southern bay but the known catches of fish are very low.

* Information derived from a RCRA PA of A.C. Ball Company (EPA ID# CAD009225434) on January 9, 1991.

he/lm&spi/clcr

SITE RECONNAISSANCE INTERVIEW AND OBSERVATIONS REPORT

Ecology and Environment, Inc.		
Field Investigation Team (FIT)		
160 Spear Street, Suite 1400		
San Francisco, California 94105		
(415) 777-2811		
E & E PERSON(S) CONDUCTING INTERVIEW AND MAKING OBSERVATIONS:		
Kimberly Hall and Howard Edwards		
FACILITY REPRESENTATIVE(S):	**TITLE:**	**PHONE:**
Kirk Willard	Supervisor/Env. Permitting	408-742-7661
Russell Schneiter	Env. Engineer	408-742-0266
SITE NAME: Lockheed Missiles and Space Company, Inc.		**DATE:** 10/17/90
CITY/STATE: Sunnyvale, California		**PEA ID#:** CAD009125535

The following information was obtained during the interview:

Wastewater generated from plating operations is handled in two ways. Non-sewarable metal finishing wastewater is routed to the pre-treatment unit at Building 114 through transfer lines from each building where the waste is generated. Between 1,000 and 2,000 gallons per day (gpd) of this wastewater is generated and treated by the facility. Sewarable wastewater from plating operations is also channeled through transfer lines but this water is collected in the two equalization ponds adjacent to Building 114. Approximately 70,000 gpd of this wastewater is generated by the facility. Treated water from the pre-treatment unit is also held in the equalization ponds. All water from the equalization ponds is discharged to the Sunnyvale publicly-owned treatment works (POTW) in batches after first undergoing testing.

Sewarable wastewater generated from all other site operations (e.g. paint booths, toilets, cooling towers) is discharged directly to the POTW.

Lockheed has three permits with the City of Sunnyvale for discharge to the POTW: 1) facility wide, 2) direct discharge to POTW from Building 113's semi conductor operation, and 3) a historical permit for discharge of waste generated from Building 195B's metal finishing research. The facility wide permit covers 98 buildings at the Lockheed facility. Twelve of these buildings have "long form" status because wastewater may contain contaminants.

Before Lockheed constructed the storage facility at Building 114, there was a storage area at what was formerly referred to as Building 14E. Building 14E has been dismantled and Building 041 currently occupies the site. In 1987, Lockheed applied for clean closure of the facility with the City of Sunnyvale and DHS but it has not been granted yet. Contaminated soil has been removed from the former storage area site. Up to 200 µg/kg of TCE have been detected in the soils at the site.

Building 114

Andco Treatment Unit: This treatment unit replaced the evaporation ponds in treating wastewater generated from on-site plating operations.

Hazardous Materials Processing Unit (HMPU): This treatment unit has been built to supplement the Andco treatment unit. HMPU can treat wastewater of higher metal concentration than can the Andco unit in addition to treating larger quantities of wastewater. The unit has been built to accommodate the new plating operations which will occur in Building 071. The unit has a 6,000-gallon primary reactor tank where the chemical treatment occurs. The first trial batches were treated the week prior to the FIT inspection.

Cyanide Destruction Unit: This unit is not currently operating. The unit will be a closed system where outgas emissions will be controlled by a sodium hydroxide scrubber. The unit is tertially contained. The chemical product tanks associated with the unit are secondarily contained. There is a cyanide detection system to detect accidental cyanide emissions. The unit will likely be permitted within the next year.

Generator Accumulation Area: Lockheed uses this covered area to accumulate all containerized hazardous wastes that are generated on site. The facility is not permitted to store waste greater than 90 days. During the inspection the area appeared to be well contained with concrete berms separating incompatible wastes. The drums appeared in good condition with no evidence of corrosion.

Degreasers

Kirk Willard will send a list of all degreasers at the facility and the locations and size of each. The large 12,000-gallon degreaser and small degreaser near the plating area at Building 182 were not in use at the time of the inspection. The large degreaser was set above a floor sump. The sump had a metal grating cover. The small degreaser was not secondarily contained. There was no evidence of spillage and the Hnu did not indicate that levels of solvents in the air were significantly above background.

Spray Paint Booths

Chemicals handled include methyl ethyl ketone, methylene chloride, and isopropyl alcohol. The booths are used to coat flight hardware and other parts as well as for potting (gluing) parts together.

There are two types of booths, wet booths and dry booths. Wet booths have a metal grating floor with water running underneath the grate. This water serves to collect generated waste. The water is discharged directly to the POTW. Dry booths have carbon-activated air filters. These filters are drummed and hauled off site as hazardous waste.

Plating

The plating area in Building 182 is raised. There is a metal grate elevated off the floor for access. The area used to have a wet floor (similar to the spray paint booths) but Lockheed has discontinued this practice.

Building 071

This building is currently used for painting operations. Lockheed has been given the authority by DHS to expand operations at the building and to construct a new degreaser as well as plating shop. When the new plating shop at this building is brought into line, plating operations at Buildings 103 and 182 will cease.

Transportable Treatment Unit (TTU)

This unit is based at Building 114. It is a pre-treatment unit contained on a trailer so that it can be moved around the facility as needed. To date, the TTU has not been used to pre-treat hazardous materials. It is usually used at Building 195B to neutralize cooling water used in the lab. This waste is diverted to a 1,500-gallon underground tank before treatment by the TTU. Treated water is discharged directly to the POTW from the TTU. The TTU is only permitted for use 180 days per year.

Building 195B (Laboratory)

Cooling water is diverted to a 1,500-gallon underground tank before undergoing neutralization by the TTU and subsequent discharge to the POTW. The building also has an accumulation system consisting of an aboveground holding tank with secondary containment. This tank is periodically pumped out by a tanker and hauled off site.

Neutralization Unit

Located adjacent to Building 113. This is a three-staged unit used to neutralize acidic wastewater generated from the circuit board manufacturing operation in Building 113. The unit uses sulfuric acid and caustic to treat wastewater prior to discharge to the POTW. The treated water is monitored for pH prior to discharge. Hydrofluoric acid waste is stored in a tank adjacent to the treatment unit prior to being hauled off site. This waste is not treated on site.

The following observations were made during the site reconnaissance visit:

The Lockheed Facility One site is completely fenced. There is a guard at the front gate 24-hours. Additionally, access to various areas of the site is restricted and there are manned guard gates or unmanned guard booths set up in several locations within the facility.

APPENDIX B

PHOTODOCUMENTATION

FIELD PHOTOGRAPHY LOG SHEET

DATE: 10/17/90

TIME: 1125

DIRECTION:

Northeast

WEATHER:

Sunny

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Lockheed wetlands including Storm Ditch 001 in the near area of the photo.

DATE: 10/17/90

TIME: 1130

DIRECTION:

West

WEATHER:

Sunny

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Closed evaporation ponds showing depression for leachate line.

>/>/vfpl

FIELD PHOTOGRAPHY LOG SHEET

DATE: 10/17/90

TIME: 1130

DIRECTION:

Northwest

WEATHER:

Sunny

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Wastewater equalization ponds which hold treated and sewarable water prior to discharge to the POTW

DATE: 10/17/90

TIME: 1140

DIRECTION:

East

WEATHER:

Sunny

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Bldg. 114 cyanide destruction unit and virgin material storage tanks.

>/>/vfpl

FIELD PHOTOGRAPHY LOG SHEET

DATE: 10/17/90

TIME: 1135

DIRECTION:

North

WEATHER:

Sunny

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

The Hazardous Material Processing Facility (HMPF) wastewater treatment system at Building 114.

DATE: 10/17/90

TIME: 1210

DIRECTION:

Northeast

WEATHER:

Sunny

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Andco Wastewater Treatment Unit at Building 114.

>/>/vfpl

FIELD PHOTOGRAPHY LOG SHEET

DATE: 10/17/90

TIME: 1150

DIRECTION:

West

WEATHER:

Sunny

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Bldg. 114
Hazardous Waste
Accumulation Area
lab pack containers
and work area.

DATE: 10/17/90

TIME: 1210

DIRECTION:

East

WEATHER:

Sunny

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Bldg. 114 Hazardous
Waste Accumulation
Area loading dock and
empty container storage

>/>/vfpl

DATE: 10/17/90

TIME: 1157

DIRECTION:

South

WEATHER:

Sunny

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Bldg. 114
Hazardous Waste
Accumulation Area
flammable and
combustable storage
bay.

DATE: 10/17/90

TIME: 1217

DIRECTION:

Southeast

WEATHER:

Sunny

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Discharge point
from equalization
ponds to Sunnyvale
POTW including
unused air pressure
tank.

FIELD PHOTOGRAPHY LOG SHEET

DATE: 10/17/90

TIME: 1210

DIRECTION:

West

WEATHER:

Sunny

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Bldg. 114
Hazardous Waste
Accumulation Area
segregated hazardous
waste storage bays.

DATE: 10/17/90

TIME: 1200

DIRECTION:

South

WEATHER:

Sunny

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Bldg. 114 Hazardous
Waste Accumulation
Area chlorinated
solvent bay.

>/>/vfpl

FIELD PHOTOGRAPHY LOG SHEET

DATE: 10/17/90

TIME: 1347

DIRECTION:

North

WEATHER:

N/A

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Bldg. 182 example of large degreasing unit.

DATE: 10/17/90

TIME: 1230

DIRECTION:

West

WEATHER:

Sunny

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Transportable Treatment Unit (TTU).

>/>/vfpl

FIELD PHOTOGRAPHY LOG SHEET

DATE: 10/17/90

TIME: 1350

DIRECTION:

Southeast

WEATHER:

N/A

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Bldg. 182
example of metal
finishing shop.
Note floor grating
covering what used
to be a wet floor
to collect spills.

DATE: 10/17/90

TIME: 1355

DIRECTION:

West

WEATHER:

N/A

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Bldg. 182 example
of spray paint booth
with grating over
water reservoir.

>/>/vfpl

FIELD PHOTOGRAPHY LOG SHEET

DATE: 10/17/90

TIME: 1137

DIRECTION:

Southwest

WEATHER:

Sunny

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Bldg. 179
wastewater surge
tank to recycle
chromium rinsewaters
from metal finishing
operations in
Bldg. 182.

>/>/vfpl

FIELD PHOTOGRAPHY LOG SHEET

DATE: 10/17/90

TIME: 1345

DIRECTION:

Northwest

WEATHER:

Sunny

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Bldg. 182
misc. material
bins for the
accumulation and
transport of hazardous
materials.

DATE: 10/17/90

TIME: 1350

DIRECTION:

East

WEATHER:

N/A

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Bldg. 182
example of
secondary containment
pallet.

>/>/vfpl

FIELD PHOTOGRAPHY LOG SHEET

DATE: 10/17/90

TIME: 1345

DIRECTION:

South

WEATHER:

N/A

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Bldg. 182
example of
small degreasing
unit.

>/>/vfpl

FIELD PHOTOGRAPHY LOG SHEET

DATE: 10/17/90

TIME: 1355

DIRECTION:

N/A

WEATHER:

N/A

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Bldg. 182 water reservoir in spray paint booth floor which collects waste and is discharged directly to Sunnyvale POTW.

DATE: 10/17/90

TIME: 1135

DIRECTION:

East

WEATHER:

Sunny

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Bldg. 179 prior cyanide destruction unit.

>/>/vfpl

FIELD PHOTOGRAPHY LOG SHEET

DATE: 10/17/90

TIME: 1505

DIRECTION:

South

WEATHER:

Sunny

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Bldg. 113
acid neutralization
unit.

>/>/vfpl

FIELD PHOTOGRAPHY LOG SHEET

DATE: 10/17/90

TIME: 1510

DIRECTION:

South

WEATHER:

Sunny

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Bldg. 113
acid neutralization
unit containment
and caustic
tank

DATE: 10/17/90

TIME: 1513

DIRECTION:

West

WEATHER:

Sunny

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Bldg. 113
temporary
hazardous material
holding area.

>/>/vfpl

FIELD PHOTOGRAPHY LOG SHEET

DATE: 10/17/90

TIME: 1515

DIRECTION:

Southwest

WEATHER:

Sunny

PHOTOGRAPHED BY:

Lockheed

DESCRIPTION:

Bldg. 150
examples of
temporary outdoor
hazardous material
storage on spill
containment units.

>/>/vfpl

APPENDIX C
LOCATIONS OF SPRAY PAINT BOOTHS AND DEGREASING UNITS

LIST OF SPRAY PAINT BOOTHS AT LMSC
Facility #1 SUNNYVALE, CALIFORNIA 11/1/90

AIR POLLUTION SOURCES - PERMITTED AND EXEMPT
FOR CATEGORY = 'COA' AND (TYPE = 'SR' OR TYPE = 'PR') AND STATUS <> 'OS' AND BUILDING < '200'

SOURCE	LMSC NUMBER	BLDG	COL	ORGN	PROCESS	STAT	CONTACT	EXTN	MANUFACTURER	MODEL	INSTALL DATE	C	R E	PM #
S-4101	M176983	041	E1	45-35	PAINT BOOTH	P	JACK SCIALABBA	26509	BINKS	8X10	/ /		Y Y	
S-4102	M176984	041	E1	45-35	PAINT BOOTH	P	JACK SCIALABBA	26509	BINKS	10X10	/ /		Y Y	
S-4103	M176985	041	E1	45-35	PAINT BOOTH	P	JACK SCIALABBA	26509	BINKS	20X10	/ /		Y Y	
S-7196	M167376	071	D2	71-44	SPRAY BOOTH 3/OVEN 2	P	BOB WILLIAMS	30352	BINKS	MP68B TLH	/ /		Y Y	
S-7198	M167375	071	D2	71-44	PAINT BOOTH 1/OVEN 1	P	BOB WILLIAMS	30352			/ /		Y Y	
S-7197	M167375	071	D3	71-44	SPRAY BOOTH 2	P	BOB WILLIAMS	30352	BINKS MFG CO	CUSTOM	/ /		Y Y	
S-7199	M167375	071	D3	71-44	PAINT BOOTH 1/OVEN 1	P	BOB WILLIAMS	30352	BINKS		/ /		Y Y	
S-7698	M149011	076	2B7	73-60	VENTILATION HOOD/CONFORMAL COAT.	AC	JIM BARLEY	65336	LMSC	CUSTOM	/ /		Y Y	
S-3601	M113729	136		81-82	PAINT BOOTH	P	TOM GALLAGHER	27233	DEVILBLISS	JDF 6621-SP	08/20/81		Y Y	
B-141001	M146069	141	B-7	27-23	PAINT BOOTH		MIKE WARREN	2-3536	BINKS		/ /		Y Y	
S-5020	M105638	150	C2	73-50	CONFORMAL COATING SPRAY BOOTH	P	FLOYD FERGUSON	22389	DEVILBISS		08/03/89		Y Y	
B-151198	SWA497	151	C6	73-60	STENCILING BOOTH	WE	LARRY ST.CLAIR	66639	BINKS		/ /		N N	
S-5147	M190070	151	C7	73-60	CONFORMAL COATING SPRAY BOOTH	P	HOBART SMITH	29342	DEVILBISS BROS.	BF 3.5	11/01/89		Y Y	
S-5139	M180106	151	D7	73-60	PAINT BOOTH	P	HOBART SMITH	29342	BINKS	SPECIAL	/ /		Y Y	
S-5149	M190397	151	F5	73-70	PAINT BOOTH	AC	RANDY AMR	21767	REFINED MOTION ENG.??		05/17/90		Y Y	
S-5150	M190399	151	H11	73-80	PAINT BOOTH	AC	ED MILLHITE	29988	REFINED MOTION ENG.??		05/17/90		Y Y	
B-151201	M175432	151	H9	62-92	SPRAY BOOTH		BILL HANSEN	27768	BINKS		/ /		N Y	
S-5180	M134490	151	K1	73-80	CONFORMAL COATING BOOTH	P	MARY CRUZ	29523	LABCONCO	LAB HOOD	02/21/90		Y Y	
S-5210	M178790	152	C23	71-44	PAINT BOOTH	P	REY DELROSARIO	29770	BINKS	A1-2448	10/06/89		Y Y	
B-152001	M087914	152	B-20	71-63	PAINT BOOTH		JIM MILLER	23997	DEVILBISS		/ /		Y Y	
S-5303	M083326	153	F6	86-13	PAINT BOOTH	P	TOM FILES	48029	DEVILBISS	LXL	/ /		N Y	
S-5323	M175542	153	J6	86-11	SPRAY BOOTH	P	GARY BRAMAN	67725	BINKS		/ /		Y Y	
S-5315	M145987	153	K-9	86-11	SPRAY BOOTH/CONFORMAL COATING	P	HANK SOREA	24443	DEVILBISS	DF-57R	/ /		Y Y	
S-5319	M145992	153	K-9	86-11	VENTILATION HOOD (CONFORMAL COAT)	P	CL BLEDSOE	24446	LMSC	CUSTOM	10/24/85		Y Y	
S-5320		153	K9	86-11	SPRAY BOOTH	WE	TROY QUICK	67734	DEVILBISS	DF-57R	/ /		Y Y	
S-5326		153A		73-30	COATING OPERATION	WE	MARK VARGAS	68009			/ /		Y Y	
S-5501	M072252	155	D10	71-44	PAINT BOOTH	P	JEFF NICKEY	22192	BINKS	AIRIR FT.	04/26/77		N Y	
S-5902	M020658	159	DX1	71-44	MASKANT/PAINT BOOTH	P	BOB WILLIAMS	30352	UNIV-AIR	JL4R	10/10/72		Y Y	
S-5912	M184742	159C	D12.5	70-54	SPRAY BOOTH	P	CRAIG HILL	21928	BINKS	PPF PNT ARRESTR	/ /		Y Y	
S-7014	M050423	170	A7	86-48	SPRAY BOOTH	P	MICK VERRATTI	20533	DEVILBISS	IDB 6244	/ /		N Y	
S-7002	M098211	170	B-2	81-33	SPRAY BOOTH	P	MRL HENSLER	30617	DEVILBISS	ISW-6015	11/14/75		N Y	
S-7005	M091943	170	B-3	81-33	SPRAY BOOTH	P	MEL HENSLER	30617	DEVILBISS	8' X 4' X 4'	/ /		N Y	
B-170005	M053257	170	B2	81-33	FUME HOOD (AEROSOL CAN APPLIC.)		MRL HENSLRE	30617			/ /		N N	
S-7417	T7447723	174	B3	71-44	SPRAY BOOTH	P	JOHN GOLDEN	20969	BINKS MANUFACTURING CO.	CUSTOM	01/24/80		N Y	
S-7411	M099516	174	C3	71-44	SPRAY BOOTH	P	JOHN GOLDEN	20969	BINKS MANUFACTURING CO.	56x52x36IN	08/18/76		N Y	
S-7408	T7447775	174	D3	71-44	SPRAY BOOTH	P	JOHN GOLDEN	20969	BINKS MANUFACTURING CO.	CUSTOM	01/24/80		N Y	
S-7405	T7447725	174	D4	71-44	PEBBLE MILL (TILE COATING)	P	JOHN GOLDEN	20969	RUDOLPH-SLETTEN	84Wx69Hx44	04/21/77		N Y	
S-7406	76024-9	174	D4	71-44	CLEAN STATION	P	JOHN GOLDEN	20969	LMSC	CUSTOM	01/24/80		N Y	
S-7407	T7447777	174	D4	71-44	BOOTH (DI water wash)	P	JOHN GOLDEN	20969	BINKS MANUFACTURING CO.	CUSTOM	01/24/80		N Y	
S-8107	M078237	181	H8	85-75	SPRAY BOOTH	P	BOB REED	32890	LMSC	CUSTOM	12/18/89		Y Y	
S-8201	M097972	182	2N11	86-13	SPRAY BOOTH	P	CHERYL COSTA	27087			/ /		N Y	
S-8223	M077847	182	C17	86-41	PAINT BOOTH	P	JERRY PETERSON	25460	DEVILBLISS	DT6200	02/09/89		N Y	
S-8234	M108901	182	F11	84-33	PAINT BOOTH	P	BOB GALL	22531	BINKS MFG. CO.	5x3x3FT	/ /		N Y	
S-8264	M149165	182	F29	86-41	PAINT BOOTH	P	FRANK BYRON	30877	BINKS	CUSTOM	/ /		Y Y	
S-8216	M052238	182	H24	86-41	PAINT BOOTH	P	FRANK BYRON	30877	BINKS	4 X 4 X 4'	01/01/70		N Y	

AIR POLLUTION SOURCES - PERMITTED AND EXEMPT
FOR CATEGORY = 'COA' AND (TYPE = 'SR' OR TYPE = 'PR') AND STATUS <> 'OS' AND BUILDING < '200'

SOURCE	LMSC NUMBER	BLDG	COL	ORGN	PROCESS	STAT	CONTACT	EXTN	MANUFACTURER	MODEL	INSTALL DATE	C	R E	PM #
S-8218	M157668	182	H25	86-41	PAINT BOOTH	P	FRANK BYRON	30877	BINKS	QVT-103	09/01/85		N Y	
S-8220	M078125	182	H27	86-41	SPRAY BOOTH	P	W.C. MATHES	28322	BINKS MFG. CO.	6L3W3-9RPT	09/14/83		N Y	
S-8209	M049520	182	H29	86-41	SPRAY BOOTH FOR ADHESIVE PREP	P	W.C. MATHES	28322	DEVILBLISS	IDB-6238	04/28/80		N Y	
S-5305	M099300	18A	C-2	86-48	PAINT BOOTH	P	CHRIS RAYMAERR	64083	DEVILBISS		/ /		N Y	
S-9502	M094185	195B	C11	48-92	SPRAY BOOTH	P	MORRIS WILLIAMS	63291	BINKS	RP3-1-2P	07/30/84		N Y	

VAPOR DEGREASORS LISTING

DATE 10/29/90
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SOURCE	BLDG	COL	MANUFACTURER	MODEL	SNAPS NUMBER	SOLVENT USED
S-0302	103	K13	BARON BLAKESLEE	SP.LV	41-166	1,1,1 TRICHLOROETHANE
S-0303	103	B3	PHILLIPS MANUFACTURING CO	T-144-S	41-166	1,1,1 TRICHLOROETHANE
S-0326	103	A-7	CYCLOTRONICS	318	41-166	1,1,1 TRICHLOROETHANE
S-0327	103	K12	DELTASONICS	DT35HL-48	41-208	FREON TF
S-1003	562	G6	DELTA SONICS	D5-RL	010552	1,1,1 TRICHLOROETHANE
S-1306	113	AA-1	BRANSON	400-R	41-166	1,1,1 TRICHLOROETHANE
S-1306	113	AA-1	BRANSON	400-R	41-208	FREON TF
S-1307	113	B-3	BRANSON	400-R	41-166	1,1,1 TRICHLOROETHANE
S-1308	113	F-7	BRANSON	250-RS	41-166	1,1,1 TRICHLOROETHANE
S-5014	150	B2	BARON BLAKESLEE	MVR-320	41-166	1,1,1 TRICHLOROETHANE
S-5117	151	C9	BARON BLAKESLEE	MVR-215	41-119	ALPHA 565
S-5120	151	E5	BARON BLAKESLEE	MVR-215	41-119	ALPHA 565
S-5121	153	C15	BARON BLAKESLEE	MVR-2160	41-166	1,1,1 TRICHLOROETHANE
S-5122	151	G11	BARON BLAKESLEE	MLR-216	41-119	ALPHA 565
S-5123	151	F-9	BARON BLAKESLEE	MLR-120	41-119	ALPHA 565
S-5124	151	F-10	BARON BLAKESLEE	MLR-120	41-119	ALPHA 565
S-5132	151	C13	BARON BLAKESLEE	MLR-46	41-204	FREON TES
S-5136	151	C7	BARON BLAKESLEE	MLR-216	41-119	ALPHA 565
S-5137	151	C-7	BARON BLAKESLEE	MLR-120	41-119	ALPHA 565
S-5141	151	H9	BARON-BLAKESLEE	MLR 120	41-119	ALPHA 565
S-5177	151	C5	BARON & BLAKESLEE	MLR-120	41-119	ALPHA 565
S-5178	151	K2	BARON BLAKESLEE	MLR-120	41-119	ALPHA 565
S-5309	153	B6	BARON BLAKESLEE	MLR-120	41-204	FREON TES
S-5310	153	K7	BARON BLAKESLEE	MVR-432	41-204	FREON TES
S-5311	153	J-7	BARON BLAKESLEE	MLR-216	41-204	FREON TES
S-5312	153	K-8	BARON BLAKESLEE	MLR-216	41-166	1,1,1 TRICHLOROETHANE
S-5313	153	K-9	BARON BLAKESLEE	MVR-432	41-166	1,1,1 TRICHLOROETHANE
S-5314	153	K-8	DETREX	SMT-BSI 2EW-SPL	41-204	FREON TES
S-7015	170	B6	BARON BLAKESLEE	DP42436	41-166	1,1,1 TRICHLOROETHANE
S-7022	170	F4	BARON BLAKESLEE	DP42430	41-166	1,1,1 TRICHLOROETHANE
S-7699	076	B7	BRANSON	400-R	41-119	ALPHA 565
S-8203	182	H21	BARON BLAKESLEE	HD1270SSPL	41-166	1,1,1 TRICHLOROETHANE
S-8232	182	2H-11	BARON BLAKESLEE	MLR-216	41-166	1,1,1 TRICHLOROETHANE
S-8235	182	2H11	BARON BLAKESLEE	MLR-120	41-204	FREON TES
S-8236	182	H21	BARON BLAKESLEE	AC-600SP	41-166	1,1,1 TRICHLOROETHANE
S-8249	182	H12	BARON & BLAKESLEE	MSR-120	41-046	FREON TF
S-8301	183	K2	BARON BLAKESLEE	MSR-120	41-208	FREON TF
S-9501	130	D5	BRANSON	1620	41-046	FREON TF
S-9503	195B	D10	BARON BLAKESLEE	MSR-120	41-166	1,1,1 TRICHLOROETHANE

LIST OF VAPOR DEGREASERS AT LMSC
Facility #1 SUNNYVALE, CALIFORNIA

11/1/90